

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor



ALONG THE BEAUTIFUL TRAIL TO SWIFT
CURRENT PASS, SHOWING SWIFT CURRENT
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FEBRUARY 1920

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Destructive lumbering in the West (Courtesy of Forest Service)—Inserts: Waste through preventable decay.

Why Wood Preservation is Imperative!

The reckless extravagance in the use of our timber resources has reached the stage where the subject is one of serious concern to the American people. This growing anxiety is reflected by a recent memorial addressed to the President and Congress by the General Assembly of the State of Illinois, from which the following extracts are quoted.

"Whereas, The United States during the last half century has witnessed the reduction of the forests in one region after another. The white pine forests of Pennsylvania, New York and New England disappeared nearly a half century ago. Likewise the pine forests of the Lake States for the most part were obliterated before 1900. The southern pineries which for 20 years have been the main supply of lumber for Illinois and other central states will, according to statements recently made by authoritative sources, be to a large extent exhausted within the next ten years.

"The effect *** has been the closing of nearby industries, *** the shifting of local population to new centers, involving heavy penalties upon both the industries and the people. As another result the country has observed the area of cutover timberland increase to *** 228 million acres. ***

"These important industries including the manufacture of railway cars, etc. *** are now threatened by the exhaustion of the forests from which their supplies have been drawn. *** Therefore, Be it resolved, by the Senate of the State of Illinois, the House of Representatives concurring therein, that the Fifty-first General Assembly of the State of Illinois urges the attention of the President and the Congress of the United States to the present timber situation and recommends that, without delay, there be formulated such a National program of forestry as will insure the future timber supplies required by the industries of the country."

(LUMBER WORLD REVIEW 5/25/1919)



After 40 years of service still in perfect condition. Sample of an entire block that was creosoted and laid in 1878—removed in 1918.

Forest products are indispensable to human existence. Wood is the most important building material, and will ever remain so. It cannot be entirely replaced. Therefore, its conservation and preservation from the destructive influences of decay and insects by preservative treatment is imperative. Every consumer can greatly reduce the loss and trouble resulting from the rotting of wood by the application of Carbosota Creosote Oil—the standard wood preservative of America for non-pressure treatments.

Our experts will advise the most practical treatment. Their services may be obtained gratis by addressing the nearest office.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air dried. Exceptions should be made in such cases and treatment modified accordingly.)

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EDITORIAL DEPARTMENT

A NATIONAL FOREST POLICY

IN the discussion of remedies let us not lose sight of the disease. A multiplicity of forest programs advocated by various agencies and from diverse standpoints is a healthy sign of awakened interest and concern. But it is important that we keep our bearings.

The disease is forest devastation. Its effect is a slow sapping of national strength—through the steady exhaustion of the national timber supply. The effect will become fatal when, through the shortage and high cost of timber, the United States is reduced to the level of western Europe, when wood is priced as an imported luxury, when not only manufactures and trade are handicapped by lack of it but the comfort of our own people and the efficiency of our agriculture are straitened by its scarcity.

It is unthinkable that the United States will accept the necessity of curtailing largely, sooner or later, its use of timber. Abundance of wood for home and farm use, for varied manufactures and for export trade has been a primary factor in our commercial supremacy, and it is a factor which we are not going to surrender. The problem must not be met by using less and less wood, down to the level of civilized existence, as France has been compelled to meet it. It must be met not by decreased use but by increased production. It must be met in the American spirit of development, of enterprise, of an organized and far-sighted handling of our resources that will supply the future requirements of a continued liberal use of timber in national development and industries.

Increased production is the cry of the times. Increased production from land is just as important as increased production by human labor. The idleness of one hundred million acres of forest land is just as serious today and more lasting in its effects than the idleness of thousands of skilled mechanics. It is nothing short of national folly to go on, year after year, devastating millions of acres of forest land and failing through bad organization, through inadequate public effort, and through a lack of clear definition of public and private

responsibility to produce one of our most essential raw materials.

Return then to the nub of the question, which is to stop forest devastation and to put waste land at work growing trees. Dismiss at once the use of cut-over land for farm crops or other forms of production besides growing timber. No one questions it when the land is needed for such purposes. But until it is actually employed otherwise, let it be kept at work producing timber. Twenty per cent of the forest land is in public ownership; and it goes without saying that the State and Nation should systematically replant denuded areas and grow timber on all of their holdings under the best standards of technical administration. Eighty per cent of our forest land is in private ownership. A part of this 80 per cent should be acquired by public owners, Federal, State or municipal, particularly areas where costly methods of reforestation are unavoidable. But it is patently impossible for the public to acquire all of the forest land in the United States or enough of it to produce the quantities of timber which we need. There are too many demands upon the public treasury to make such a program practical or effective. The timber which we must have cannot be grown without the active participation of the private owner of forest land.

Obviously, the public has a large interest in preventing the devastation of privately owned land. The correction of certain factors which contribute to forest devastation rests primarily with the public. Among these are methods and practices in taxing woodland which render it difficult for the owner to grow young timber; the fire hazard in forest regions and its corollary, the inability of owners to insure timber or young growth; the difficulty in obtaining loans for long-term forest enterprises at rates commensurate with the duration and character of the enterprise; and the lack of sufficient information in a form for practical use on how to treat forests in order to get certain results.

There are also specific things which must be done in the woods. The first is to fire-proof cutover areas as

far as that is practicable by some form of slash disposal. The second is to detect and put out forest fires. In many parts of the United States these two measures in themselves will largely or wholly stop the devastation of forest land. A third, more rarely needed, is to reserve in cutting enough trees to reseed or restock cutover land where otherwise it would become waste. In these steps also the public should co-operate. But the public cannot and should not do it all.

A measure of responsibility must be accepted by the owner of the land. Whether the owner should be responsible solely for preventing his land from being a menace to his neighbors, through the accumulation of slashings, or from being a menace to the economic welfare of the State and country, through idleness, it is not the province of this brief resume to determine. The

point not to be lost sight of is that the obligation and the burden of perpetuating our forests are mutual. The public will carry its share, but only if the forest owner himself is in step. Public support for fire protection and tax adjustments cannot be obtained unless the men and the industries primarily interested in the land do their part and the joint effort actually succeeds in growing timber.

It will not be possible to do everything at once. Slash disposal and fire protection should be the first objectives and may have to be pushed in advance of others. But there should be no half-hearted measures, no obscuring of the ultimate object to be attained. Whatever the line of attack, it will be effective only in so far as forest growth actually replaces forest devastation.

LIGHT BURNING IS A MISTAKE

IT is axiomatic that the protection of forests from fire is the first step in any forestry program. It is equally axiomatic that the only kind of protection which promotes forestry in the long run and which therefore has a place in a national program looking to the future is protection which conserves and promotes tree growth. The owner of merchantable timber may protect his property from fire as the owner of a coal mine would do; but if the timber property is protected simply as a mine and the methods of protection destroy its capacity for growing timber after the virgin stumpage is cut, it is simply a phase of timber mining and not forestry.

Every one recognizes the utility of fire properly controlled, as a means of forest protection. The burning of slashings on cut-over land is often essential not only to eliminate a menace to adjoining areas of uncut timber but also to protect the young growth already existing on the cutting. It may even be wise to burn up a small part of the existing young growth in order to clean up the slashing and give the young trees which remain a reasonable chance to escape future fires. In certain forest types, like the Douglas fir areas of the Cascades, where the new forest must be grown from seed in the ground, the clean burning of whole cuttings under careful control is good forestry. In most of our pine, spruce and balsam forests, on the other hand, and in many of our hardwood forests, part or all of the new timber growth is on the ground at the time of cutting; and forestry demands that that growth be preserved as far as possible and that such firing as is done be very closely controlled, in brush piles or otherwise.

The public conception of forest protection must be a conception of forests so protected that they will be perpetuated. The protection sentiment which is developed by educational activities must be predicated not upon simply protecting an exhaustible resource like a mine

but upon protecting forests so that they may continue to grow timber. Any theory or proposal which directly or indirectly undermines this basic conception of forest protection is putting the country back rather than ahead in forestry progress and must be fought without quarter.

A number of large land-owning interests in the Western States, particularly in California, are advocating the so-called light burning of timberlands at frequent intervals. It is asserted that by burning pine forests every few years the woods will be kept clean of inflammable debris without injury to the merchantable stumpage. The constant burning out of small growth, underbrush and litter would thus supposedly protect the forest from serious conflagrations. Advocates of light burning even assert that pine forests protected by their system will not burn and that the smaller trees themselves will survive carefully regulated firing in the proper season of the year. Light burning is thus advocated as the solution of the protection of pine forests, as a substitute for the whole protection system of fire detection and suppression, of close control of the use of fire, and of a public sentiment alert at all times to keep fire out of the woods which the Forest Service and many State and private agencies in the West have expanded so much effort and money to develop.

This proposal is like the announcement of a nostrum which will cure tuberculosis and which at one stroke eliminates the necessity for the sanitary regulation of cities, for tuberculosis sanatoria, for fresh air, nourishing food, and every other means employed by medical and hygienic science to combat the white plague. It is exactly the repeated fire, beginning in the Indian days, which has steadily eaten up the pine forests of California and other Western States. The National Forests of California today contain nearly two million acres of land once heavily timbered but now reduced to brush patches as a result of repeated

burnings extending over fifty or a hundred years. It is impossible to fire these pine forests on any extended scale without destroying at least a large part of the small growth and at the same time eating out the butts of the old trees little by little. A careful investigation has shown that on the areas deliberately fired by advocates of light burning, the extent of the destruction is essentially the same as in any ordinary fire in the pine woods.

Light burning means nothing more nor less than the continuance of the frequent ground fire, which steadily and irresistibly destroys the western pine forests. At its best, this practice is simply a measure for the protection of old timber. It is part of the process of timber mining, which values nothing but the old growth and turns land into unproductive waste. To the gutting of the forest by heavy cutting, it adds the gutting of repeated ground fires. An area cleaned by light burning has no advance young growth to replace the virgin timber after cutting. Its general application would mean that our western pine forests would be replaced by brush fields unless enormous expenditures are made for artificial planting.

Forestry practice in the United States doubtless will develop further uses for carefully controlled fire as a means of protection. The extent to which this method can be used in the southern pineries is a matter to be

determined by investigation. In the western pineries, where the tree species and climatic conditions are totally different, the experience of the Forest Service in fifteen years of fire protection, timber cuttings and forest renewal makes the basic facts of the situation absolutely clear. Light burning has no place in a system of forestry which seeks to perpetuate our western pine forests and make them continuously productive. The plausible arguments advanced in advocacy of light burning make this proposal exceptionally dangerous. It tends to weaken the confidence of the public in a genuine system of fire protection. It tends to weaken the support given by timberland owners to joint and organized protective efforts, such as the Forest Service and many western associations have been largely successful in bringing about. It tends to prevent progressive fire protection legislation in the Western States. It tends to encourage incendiarism. It is essentially a challenge to the advocates of a national policy of forestry for it strikes directly at the effort to keep timberlands productive rather than permit them to become waste. The American Forestry Association and the United States Forest Service will therefore oppose the light-burning theory with all the resources at their command; and they both feel that the issue which this proposal has raised should be met squarely by the forestry interests of the United States.

INCREASE IN FOREST RESEARCH NECESSARY

THE time has come when we must grow timber. Under the pressure of necessity we must make the best of the knowledge we have of methods, imperfect though that knowledge may be. The handling and perpetuation of our forests in the last analysis must, however, rest on a solid foundation of careful and thorough forest investigations. Too few people today realize the value and importance of agricultural experiment stations in furthering the interests of the farmer and showing the way to more scientific and more profitable farming. An even smaller number recognize as yet that forestry as a pursuit, closely resembling agriculture, can be furthered in much the same way. Results are obtained with farm crops in one, or at most, two or three years. It takes only a few years to produce new varieties of farm crops, and the farmer obtains the first year an increased return from the use of scientific methods developed by the experiment stations. If investigations in agriculture are important under these circumstances when the mistake of one season may be corrected the next, how much more important it is that the growing of trees, involving decades or perhaps a century, should be scientifically conducted and that experiments along this line, also requiring very long periods, should be initiated at once? One may not hope

to plant a tree and also see it ready to cut for lumber. All the more reason, then, why the person who starts the business should have a clear, scientific understanding of what the results are likely to be. On the National Forests in the West a start has already been made to meet the demands of forest management for accurate knowledge by establishing several experiment stations. The work at these stations should be materially strengthened. In the East, however, where the economic conditions are more ripe for the handling of the forests as a permanent resource, there is, in spite of a large number of agencies and forest schools interested in the problem, a lack of co-ordinated effort toward securing accurate scientific knowledge.

The establishment of several forest experiment stations in the East to solve the problems of New England, of the Southern Appalachians, of the South Atlantic and Gulf States, and of the Lake States, is particularly urgent. This need has been long felt and can no longer be neglected. Every timber owner, every forester, forest school, and the various wood-using industries which are vitally dependent upon the forests should see to it that forest practice in the East should be based on the results of investigations conducted at forest experiment stations, just as agricultural practice is becoming more

and more grounded on the results of the agricultural experiment stations. The Federal Forest Service should be provided with funds sufficient to establish and maintain such stations independently or in co-operation with States or other agencies. The present appropriation of the Forest Service for purely forest investigations is ridiculously small; it barely amounts to 1-100 of 1 per cent of the capital represented by the timber alone on the National Forests of the West and only 2 per cent of the present income from those forests. Uncle Sam, one of the greatest timber owners in this country, in his expenditures for forest research is far behind many industries in this country and the governments of many European countries. The size of the present appropriation is still more ridiculous when, in addition, Uncle Sam's duty to furnish private owners with the information they need to grow timber is considered. This duty should be as fully recognized in forestry as in agriculture.

As the original and present source of a large part of the nation's well-being, the forests of America must be sustained, to the end that our descendents shall have and enjoy lumber, paper and water as we have had and now enjoy them; that the pleasures and inspiration of the forest shall not be lost to the people; that no part of our land be given over to waste, but all made productive according to its quality.

That there can be no forests, and no forestry, where fires are allowed is self-evident. That every community and every interest must maintain a forest fire service is not generally recognized. The nation, the states and every private interest must unite to provide the money and the leadership that are required to make the effort effective. To hold a forest, mature or immature, for future revenue or enjoyment is a speculation, not an investment, unless fire control is established.

Forestry, its aims and agencies—fire control, silviculture, state economy, are still little understood. Habits of neglect and wastefulness attach to our woodlands and are deep-rooted. An active, prolonged campaign of education, in which the nation and the states shall co-operate, is imperative.

As four-fifths of our woodlands belong to private owners who rarely are willing to incur the risk, or to make the investment necessary to provide future timber, it is advisable that the nation, the states and many municipalities acquire public forests. But since this is not generally practicable, or can be undertaken in only a limited way, means must be found to induce owners to

practice such controls as will insure the continued productiveness of their forests. A wise plan would offer the owners of true forest land an alternative of maintaining it on a productive basis or selling it to the public. Usually adequate protection against fire would be sufficient inducement.

There is little foundation for the many claims that our forests are over-taxed. Their increasing value does induce higher assessments, and higher assessments often leads to realizing fellings; yet real evil lies in the uncertainty as to when the upward movement will stop, and in the inequities that frequently are created. Though forestry considers the public interest before that of individuals, it seeks no favors at the expense of any other class of property. It asks only that the tax burden be adjusted to the long periods required to produce timber trees. This means that a part, at least, of the annual levy should not be collectible until the trees are marketable, and that such deferred tax be *predetermined*. No one can be expected to invest money in growing trees unless he can calculate, and discount if necessary, his future obligations.

Upon forest lands that have been devastated—usually by fire, a new forest can be established by planting. In such cases the work should begin as soon as fire control is assured and be carried forward systematically. Yet these conditions are relatively rare. If logging is done with reasonable care and fire kept out afterwards, nature will establish new forests which can be improved by a forester's skill. Be it remembered that nature is a ready, if not very skilful forester; that many million trees, much less a tree, or a few trees, planted here and there will not renew, or replace, the forests that we destroy; that if we stand for planting at least ten young trees must be started for every mature tree that is felled for lumber. Planting at high cost cannot be avoided in some localities; the effort everywhere must be to secure natural rather than artificial forest renewal. Again fire control will go far.

Mountainous and very rocky land is clearly indicated as fit only for forestry. Every other kind—wet, dry, sandy or alkaline, may be agricultural, or pastoral, or forest under present, or reasonably anticipated future conditions. Lack of information regarding soil values has given opportunity to land sharks and prevented forest renewal on land that has no possible agricultural future. The soil surveys made by the Federal Government in co-operation with a number of states should be extended so that there may be definite knowledge of what should be permanent forest land and what is fit for conversion to other uses.

TREE SEEDS PRESENTED TO OUR ALLIES

THIRTY-SIX million forest tree seeds for reforesting their war devastated lands were presented by the American Forestry Association to France, Belgium and Great Britain on Thursday, January 15. The presentation was made at Boston, on the Common, by Presi-

General for Belgium, and by Captain Gloster Armstrong, the Consul General for Great Britain.

In presenting the seed Mr. Pack said: "A hundred years from now these trees will tell the glory of all those who heard the call of humanity from across 3,000 miles



A PORTION OF THE SHIPMENT OF SEEDS TO OUR ALLIES

The contribution of forest tree seed by the American Forestry Association to France, Belgium and Great Britain comprised approximately 36,000,000 seeds. The photograph shows only a portion of the shipment, the remainder of which will be sent later. President Charles Lathrop Pack, of the American Forestry Association, is at the right of the photograph with a British flag in his hand.

dent Charles Lathrop Pack, of the American Forestry Association, and the seed was formally received for their respective governments by J. F. J. Flamand, the French Consul General; Redington Fiske, the Consul

of water. We on this side are planting memorial trees and "Roads of Remembrance," but this gift to help reforest the battle areas and areas in Great Britain which were sacrificed to war's demands will, I believe, do more

than anything else toward cementing the friendship that was born of war and baptized in blood.

"As a memorial, as a sign of ever renewing life, as a symbol that they have not died in vain there can be no more fitting monument than the 'tree that looks at God all day and lifts its leafy arms to pray.' The American Forestry Association is proud indeed to collect and present this gift to your governments. May every tree seed prosper and grow and carry the message not alone of the American people to future generations, but may each one of them carry the greater message of Him who heard humanity's call and answered."

The seed was purchased with money contributed by

France and Belgium will use the seed sent to them for replanting forest lands in the war zone, while Great Britain, which cut down fifty per cent of her woodlands to supply her war needs, will use the seed for part of the great reforestation work which will start in the spring.

In the shipment were the following amounts: Douglas fir, 20,000,000 seeds; western larch, 9,000,000 seeds; tideland spruce, 3,000,000 seeds; Englemann spruce, 2,500,000 seeds; white fir, 700,000 seeds; sugar maple, 550,000 seeds; white ash, 300,000 seeds; tulip poplar, 120,000 seeds; rock maple, 110,000 seeds; red oak, 40,000 seeds; black oak, 4,500 seeds; scarlet oak, 3,000 seeds.



DONATION OF FOREST TREE SEEDS TO OUR ALLIES

At Boston On January 15, 1920, the American Forestry Association presented to France, Belgium and Great Britain a quantity of forest tree seed for replanting the areas devastated by war. President Charles Lathrop Pack, with an American flag in his hand, presenting the seeds to Consul General Gloster Armstrong, of Great Britain, Consul General J. F. J. Flamand, of France, and Consul General Redington Fiske, of Belgium.

members of the Association and some was also presented by the States of New Jersey and Ohio. Other seed has been offered by Louisiana and North Carolina, and will be sent when received.

More seed would have been purchased had it been possible to secure it, but the 1919 crop was unusually poor and the supply was small. France wanted white pine, but none was to be had; France and Great Britain both desired Douglas fir, but it was impossible to secure a large quantity of it.

In accepting and acknowledging the gift, Captain Gloster Armstrong, the British Consul General, wrote:

"I wish to express to you my appreciation of your courtesy and kindness at the presentation of the very generous gift of forest seed by the American Forestry Association to Great Britain and the British Government and its representatives are most grateful."

C. Symons, Counsellor of the Belgian Embassy wrote:

"These seeds will be welcome in our country where

the forests have been devastated to such an extent during the war, and the Belgian people will be most thankful to your Association and grateful for the part played by it in our work of reconstruction. Permit me to extend, on behalf of the Ambassador and also on behalf of my compatriots which your Association will thus help, the expression of my sincere thanks and of my deep appreciation."

Acknowledgment was also received from the French embassy.

Donors of the Fund.

Donations to the reforestation fund were received from: L. F. S. Barnard, W. W. Davies, Eugene Klein, W. E. Knox, Mrs. H. D. Peck, Wallace Improvement Association of Cranford, N. J.; Mrs. L. P. Houghton, Frank C. Demmler, William A. Robinson, Miss J. B. Thacker, Miss Eva A. Klemm, George C. Beach, Harry L. Burrage, Mrs. Wm. M. Chase, Miss F. M. and Mrs. L. W. Hazen, Miss A. B. Law, William Meigs, Miss P. L. Hosmer, A. J. Willes, William K. Brown, Charles E. Falconer, E. M. Halcombe, Mrs. Samuel B. Jones, William O. Bates, George H. Hines, Mrs. B. Henry, Mr. and Mrs. G. Earle Kelley, H. D. Markley, E. S. Brownsill, Donald Hill, Thomas Bolster, Florence Bratenahl, Civics Class, N. S. H. School; E. I. Howard, Mary H. Lord, Mrs. E. C. Marmon, Mrs. T. M. Guthrie, G. W. McAllister, L. Dennis, Mrs. F. B. Huntington, Dr. C. A. Hammann, H. L. Lewis, I. J. Merritt, Mrs. H. W. Adams, Jr., Fred Burke, Theodore Foulk, Mrs. A. F. Hager, Mrs. Daniel Beckwith, Mary B. Jewett, F. M. Kirby, Hiram W. Sibley, Miss A. H. Pybas, Mrs. Charles Peabody, Mrs. R. W. Walker, Miss A. Wilson, Paul Watkins, Richard Bennett, Isaac S. Swift, William Gray Purcell, Mary E. Converse, Jacksonville Public Library, Anna Handil, T. S. Wynkoop, F. B. Williams Cypress Company, Henry Allifler, E. H. Simmons, M. R. Hohen, J. Levering, F. E. Mamm, Ora Gales, W. J. Ritterkamp, Grace S. Cover, Mrs. Nelson Penn, H. D. Lloyd, Charles H. Tillhoman, J. Cole, E. S. Webster, Miss H. Slicer, R. G. Kirk, L. L. Winsor, Mabel Stewart, F. D. Gundry, L. Blake, B. H. Pollock, Christian Norton, Poveshiek Township Women's Club, Garden Club of Philadelphia, H. S. Upson, C. W. Miller, Julia B. Douglas, Robert Carlisle, O. O. Charlton, "Friend," Garden Club of Philadelphia, B. J. Lang, B. H. Dickson, Jr., R. L. Winthrop, M. P. Toulmin, C. H. W. Foster, Arthur Hobart, J. E. David, Mrs. Charles P. Putman, Mrs. S. Warren, Mrs. J. H. Beal, F. W. Upham, C. Hutchinson, Anna W. Phelps, S. Hutchins, F. S. Winston, J. B. Ames, G. Whiting, Ernest W. Bowditch, Mrs. C. L. Edgar, A. H. Hinkle, K. L. Wilks, S. L. Sewall, E. P. Welles, C. M. Griggs, S. B. Davol, M. S. Devereux, Charles H. Frost, R. Sayre & Company, Bryan Lathrop, W. P. Corey, H. D. Tudor, Henry H. Proctor, H. E. Raymond, George P. Metcalf, Herman F. Vickery, William C. H. Lloyd, William A. D. Foster, Elizabeth L. Cheney, F. W. Barth, M. B. Johnson, Albert L. Baily, J. G. Thorp, Donald M. Hill, E. B. Haskell, George Biddle, Maude E. Stafford, Mary P. Seaverns,

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The Trees of France

All honor to the trees of France,
That grew so tall in days of yore;
Hewn down in hate by Hun advance,
Those martyred forests are no more.

All honor to the trees of France,
So proudly cut to save their land;
Oh sad, regretful circumstance,
But not by ruthless Teuton hand.

All honor to the trees of France,
Her stately forests yet to be;
Whose seeds are planted not by chance,
But sent from friends across the sea.

—Elizabeth T. McGaw

RECLAMATION WORK A VITAL FORESTRY PROBLEM

R. S. MADDOX

FORESTER, STATE GEOLOGICAL SURVEY, TENNESSEE

ALL foresters and lumbermen, as well as many other citizens, recognize the increasing scarcity of lumber. This scarcity is evidenced in many ways. In the first place lumber prices are soaring everywhere. Even prior to 1914 the man on the street had begun to comment on the high cost of lumber compared to 20 years ago. Furthermore, a class of timber found in logging yards today and commanding a good market would have been considered too inferior for use at any

latest record) was approximately one-half of what it was in 1909. It is generally known that the centers of production in this country have narrowed down to states on the Gulf and Pacific Coasts. In other words, the greater part of the United States today is harvesting second-growth timber. It must be recognized that this situation has been greatly augmented by the methods employed in handling our once forested lands. It is the old question, lack of proper conservation. This is a big subject with



GULLIED LAND IN EASTERN TENNESSEE

This gullied mountain land is too steep for cultivation, and is of the type which should never have been cleared of its timber.

price a few years ago. The destruction and use of lumber in the world war added tremendously to the scarcity of timber, its immediate demand, and therefore, to its higher price. Since the war we are faced with almost prohibitive prices, and yet the end of these high levels is not in sight. This condition must be attributed not merely to increased demand and post-war readjustments but primarily to a scarcity of timber. Records of the annual output of lumber in many states show a distinct and in some cases a heavy falling off in the past ten years. For instance, Tennessee's output in 1917 (the

many phases, one of the most important being the reclamation of waste lands.

The rate at which land has been virtually wasted is prodigious, and the lack of general serious concern about it is only too manifest from the amount of such lands and their apparently total neglect. In the sum total of these abused areas forest fires can be charged with a good round per cent of damage, but there is another form of waste which comes from wrongful clearing of land or improper management after clearing and which might be classed under three heads, viz: first, the clearing of

lands too steep for cultivation; second, clearing of lands too shallow for cultivation; third, neglect of lands whose productivity could have been maintained by proper management. In the hilly and mountainous sections of Tennessee it is often easy to follow the steps by which waste lands result. For instance, the lower slopes having been cleared first gave way to "breaks" or small gullies and at the same time became somewhat "worn" or depleted of fertility. It was decided by the owner to clear

a strip of the adjoining woodland above. After a few years the older field was turned over to pasture or waste. The new ground being steeper yielded more

quickly to erosion and the next step was to clear more new ground still higher up which often took in the entire hilltop. It can be stated that much of the first and second classes of waste exist because of the old idea that land is

not worth anything to the owner unless he can use it—meaning, unless he can cultivate it or graze it. The trees are, therefore, from his point of view, in the way, and thus many an acre of timbered and "timber" land has been turned to waste.

The third class of land

results from neglect. This is agricultural land and could have been kept productive. Improper management, the exhaustion of fertility, and neglect of incipient erosion



WASTE LAND

This should have been maintained in crop production. The grade of slope is low. Western Tennessee.



CULTIVATED MOUNTAIN LAND IN EASTERN TENNESSEE

This mountain land has been cleared and cultivated for a brief period and then turned into pasture. Though yet new ground, as is shown by the stumps, the soil is rapidly sloughing off.



ANOTHER AREA OF WASTE LAND IN WESTERN TENNESSEE

This was before any work was done upon it, in 1917. Brush dams were built, the banks plowed off, and locust trees set out in the spring of 1918.

have left much land in a waste condition and taken the owner into the woods for more new ground. Regardless of the comparative cost of this operation as against maintaining the older fields, the tendency to clear more new ground instead of protecting and building up the existing cultivated sections has helped to swell the large total of waste acreage in the state. Whether the damage comes from fire, wrongful clearing of steep slopes and shallow soils, or from neglect, the result is a needless drain upon lands that should for the present at least grow timber. It is evident that so long as lands are permitted to waste away, the forest must pay the penalty. Woodlands are the only source from which a new acreage of tilled land can be obtained, unless the waste is reclaimed. Redemption of waste lands will necessarily put a heavy check upon further clearing and should at the same time promote soil maintenance and soil building. There is enough cleared land in Tennessee for the present, even more than required. Broadly speaking the only justification for further clearing is a real need for more agricultural

acreage through an increase in population, and this, only after conscientious care has been taken of the waste areas.

Reclamation may be costly, but the lack of it in the end is costlier. On waste sections such as prevail in Tennessee, reclamation is guaranteed by proper effort. It has passed the experimental stage and is a success. Many of these lands can be very shortly turned into growing post timber, a valuable product. Some can be made into pasture, while others can be redeemed easily for cultivating crops. In fact a great proportion of this last class can be redeemed with as little or less cost than that of establishing the same acreage of new ground.

Foresters everywhere must take hold of the waste land problem. Reclamation saves woodlands from destruction just as surely as protection against fire saves them. It will not only return much abandoned territory back into forest growth directly, but where the land is reclaimed for agricultural purposes it gives to the farmer new fields and prevents his clearing an equivalent additional area of woodland.



A YEAR AFTER RECLAMATION

This is the same area of waste land photographed in July, 1918, after the locust trees had been set out.

NATURAL REGENERATION OF FRENCH FORESTS

BY THEODORE S. WOOLSEY, JR., L. d'H., D. S. O.

FORMERLY LIEUTENANT-COLONEL ENGINEERS, U. S. A.; MEMBER INTERALLIED WAR WOOD COMMITTEE, PARIS, 1917-1919

Illustrations by Commandant Thiollier, French Army. (Service des Eaux et Forêts.)

OVER three centuries ago Colbert, Minister under Louis XIV, warned France that some day she would perish for want of wood. At that period wood was used largely for fuel, as well as for building; the coal and cement age had not commenced. Each locality depended upon nearby supplies because transport to any distance was impracticable. Under these conditions Colbert's warning was heeded and in 1669 he was able to put into effect a Forest Code, which insured the protection of French forests. Under the stress of the Napoleonic wars it is true that the resources were further depleted but in the eighteenth and nineteenth centuries Demontzey and Brémontier firmly established the practicability of reforesting the dunes and the eroded Alps. During the great war French forests have been heavily cut, and have been destroyed by shell fire to such an extent that it will take a century to make good the loss. Timber supplies cannot be replaced until the plantations mature and it takes two centuries to grow commercial oak; a century and a half to produce spruce or silver fir logs, and a century to grow pine. Hardwood copice produces fuel in twenty to thirty years, but modern industry requires coal or electricity for power, instead of wood or charcoal.

Had France allowed the destruction of her forests during the nineteenth century the Allies might have lost the war. Not only were the wood supplies required locally, to economize ocean tonnage and railway transport, but the forests themselves were needed as a line of defense. Without such forests, as Compeigne, Villiers-Cotterets, Coucy, St. Gobain, Foret de la Mont de Reims and others it is probable that the German drives in 1918 would have been more successful than they were—and they nearly succeeded as it was. It is at least significant

that the German advance on Paris in June, 1918, was stopped in the forests of Compeigne and Villiers-Cotterets. The value of forests as a means of defense is so recognized that the French Forest Code provides that no private forests can be denuded, in the frontier zones, without the specific approval of the civil and military authorities.

The French forester has always been a close student

of soil conditions, seed crops, and methods of seed germination because his ideal has always been to obtain the natural regeneration of forests, and today, high labor costs will make artificial forestation almost prohibitive. The Germans have favored the clear cutting of stands, followed by planting or sowing. They argued that natural regeneration was the more costly in the end, because to naturally regenerate forests took fifteen to twenty years, and that even then the results were unsatisfactory. Probably both schools of technique are correct. With the Northern climate of Germany the artificial replacement of stands is often obligatory but in France, with plenty of rainfall, rich soil, and species that produce seed crops in abundance, natural regeneration has succeeded and will be continued, except where normal forest conditions must be restored in the devastated war zones and where the damages of



A LARCH STAND IN THE FRENCH ALPS WHERE THE SOIL MUST BE WOUNDED TO SECURE NATURAL REGENERATION.

past over-cutting have not yet been completely repaired.

The French forester is a student of nature. He has been taught to "*Imiter la nature, hater son oeuvre, telle es la maxime fondamentale de la sylviculture.*" His simplest problem is where he can clear cut the entire stand and yet secure his second crop without planting; his difficulties increase as the number of cuttings must be varied in degree, and in amount, so as to tempt the next generation of trees to gain a footing in competition with grass, weeds, and undesirable species. But he



MARITIME PINE GROWN ON THE SHIFTING SAND DUNES IN THE GIRONDE, FRANCE.

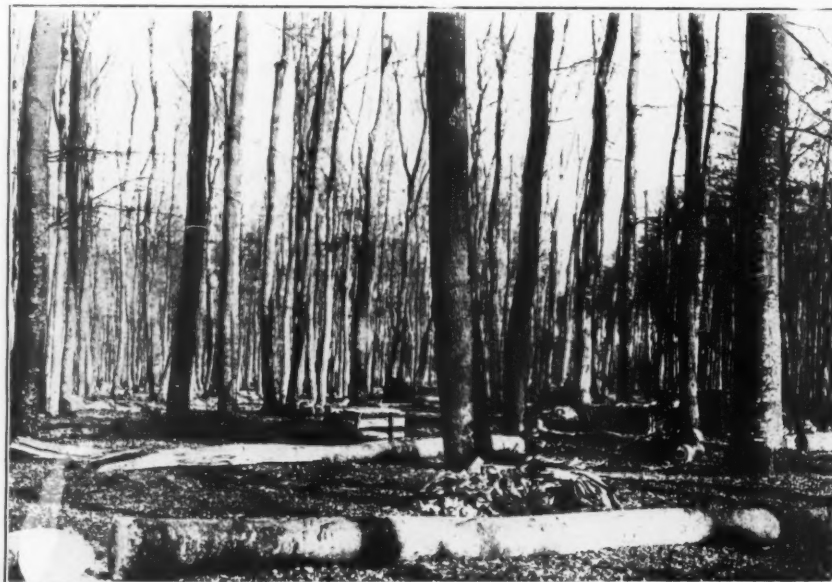
recognizes that success cannot always be obtained under these difficult conditions without assisting nature. Consequently he is ready to wound ground covered with grass, so that the seed can germinate in the mineral soil, or he may have to cut back briars, or heather, which is crowding out the commercial stand.

In the latter part of the eighteenth century the Landes and Gironde was fast becoming waste land. The sand had been blown over forests and fields so that even villages had to be abandoned. Today this area is in productive maritime pine forests, producing lumber, mine props, ties and turpentine. These forests ripen in seventy to eighty years and upon maturity are clear cut. After lumbering, the branches and unmerchantable tops are left on the ground; the sun opens the cones and the sand is quickly covered with a stand so dense that it must be thinned

to reduce the competition for light. Then as the seedlings grow into saplings, the excess trees are tapped to death to produce resin and mine props and to favor the development of the crowns of the final stand. Maritime pine must have large, well developed crowns to produce resin, the major crop. Fires must be kept out and there are protection belts along the ocean to prevent the drifting of sand.

The sessile oak in the rich valley of the Adour, where there is an annual acorn crop, can be clear cut and reproduced with the same ease but in the sessile and pedunculate oak stands (often mixed with beech in Central France) the regeneration must be by progressive cuttings. With oak the technical objective is to produce large timber requiring 180 to 240 years to fully mature. Oak is an intolerant species so seedlings must have light for their development, while the beech, on the other hand, requires for a time a protective cover of older trees, against frost and sunlight. If the mother stand were clear cut, the ground would run to weeds and the oak and beech would be only partially successful, because good seed years are six to eight years apart. Under these conditions there are three successive fellings. The seed felling aims at starting the seedlings, the development of the crowns of the seed trees and the partial removal of the merchantable crop.

According to the teaching of Boppe, a great French silviculturist, all trees, other than seed trees, whose foliage extends to the ground and is, therefore, suppressing seedlings, are removed; beech, or hornbeam, which often forms a valuable understory, in order to preserve soil conditions up to the time of the seed felling, is cut. If the soil is covered with weeds, they are cut level with the ground as are also oak advance growth which would not do for future regeneration. The soil after a seed felling must be cleared of all low growth.



A SEED FELLING IN THE STATE FOREST OF HEZ-FROIDMONT, FRANCE.



METHOD OF DEFENSE AGAINST DRIFTING SANDS IN THE LANDES, FRANCE.

If necessary, the surface of the soil is loosened by wounding it. A successful seed felling is where there are one or two seedlings per square yard. Often there is practically a carpet of young oak. The next step (secondary felling) is to *gradually* remove the seed trees and to *gradually* free the existing seedlings without causing too

much damage. These secondary fellings in oak stands are usually two or three in number. Care is taken not to expose the existing seedlings to late frosts and not to damage too many seedlings in the lumbering operations and to retain enough seed trees in localities where seedlings have failed. The removal depends primarily on



SUCCESSFUL NATURAL REGENERATION OF SILVER FIR AND SPRUCE IN FRANCE



A MATURE STAND OF SPRUCE AND SILVER FIR IN THE JURA, FRANCE, SECURED BY NATURAL REGENERATION.

the condition of the ground. If the seed crop is poor, it may be necessary to again cut back the weeds and to have resort to wounding the soil. If, on the other hand, the seedling growth is very luxuriant, cutting can be much heavier. The result of the secondary fellings is to increase the growth and development of the seedling crop and to enable them to maintain possession of the ground. As soon as the young crop is complete and the



A SELECTION FOREST IN HTE. SAVOIE, FRANCE.

first seedlings have developed into saplings, it is time for the final felling. This felling merely removes the remainder of the seed trees at one stroke, since it is rarely advisable to hold over a few seed trees even where regeneration may be lacking in a few spots. When seed trees are held over, it means that very valuable timber decreases in value, since as soon as these mature oaks are isolated, epicormic branches develop, the crown deteriorates, large branches die and there is great danger of rot or damage from insects. A feature of oak and beech naturally regenerated is the maintenance of the soil in good condition and suitable mixture of beech in the understory. The tolerant beech always has a tendency to take possession of the soil, and, therefore, it is often necessary to favor the oak. This can be done by reserving more oak seed trees, in the seed felling,

and by cutting the beech in the understory; by hastening the secondary felling and making it rather open wherever oak seedlings have established themselves. Otherwise, they may be crowded by the tolerant beech. The seedling of the oak may also be increased by wounding the ground so as to bare the mineral soil. Then, when the seedlings are freed from the competing weeds and briars, the oak can be favored. In the thinnings, which commence when the oak is thirty to forty years of age, it can be assisted in its competition with the beech.

In fir stands, advance growth almost always exists, therefore the seed felling is really a light secondary felling, since its object is to allow this advance growth to develop. This first secondary felling, or seed felling, is made very conservatively so as to remove the cover gradually and not to expose the seedlings to drying out or to



ADVANCE GROWTH OF SILVER FIR IN FRANCE READY FOR THE REMOVAL OF COVER.

permit weeds to take possession of the soil. Even if suppressed for a number of years, fir seedlings have the ability to develop into good trees after the cover has been removed. The other secondary fellings which follow should also be "dark" since a gradual removal of the cover is essential. On the other hand, the final felling should always be complete on account of the danger from windfall and on account of the damage which



SECONDARY FELLING IN THE FRENCH STATE FOREST OF HEZ-FROIDMONT.

results to the old isolated trees from drying out. This method has been used successfully for generations and may be studied in the famous State forests of Perseigne, Berce, Blois, Hez-Froidmont, Senouches and Belleme, all within a day's motor trip from Paris.

In the high mountains a somewhat different procedure must be followed with the silver fir or spruce. Here the objective is not solely the production of lumber. The slopes must above all be protected to avoid damage by erosion. Therefore a part of the mother stand must always be left standing and much the same method followed as can be viewed in any of our virgin stands, where trees die, or are windthrown and the openings then fill up with seedlings, or weed growth. The forester removes these mature trees before they are decadent. Nature is improved upon. He determines the age when trees are ripe and periodically cuts every tree, or group of trees, that has reached maturity. Regeneration by this selection, or group selection method, as it is termed, is easier with silver fir, a shade enduring species, than with spruce, which requires some sunlight for development.

According to Boppe: When in mixture, advance growth of fir is quite common under the old stand. It is, therefore, necessary to fell here and there old trees in order to enable the spruce to profit by the light and establish itself in the center of the openings. While the advance growth of the fir has the advantage of age, the spruce seedlings develop more rapidly and make an excellent mixture. The more you want favor the spruce the larger the openings should be made. It is also advisable to favor it by wounding the soil. The mix-

ture can be regulated in the cleanings and thinnings that follow. Soil preparation is often necessary in progressive clear cutting, yet in France the sentiment is everywhere in favor of natural regeneration, preferably without the additional expense of artificial soil preparation. But the success of natural regeneration depends on the proper number and location of trees bearing seed, the right amount of light or shade for the development and existence of the young seedling, as well as upon proper texture of the ground free from weed cover. It is only under the most favorable conditions that some kind of soil preparation is not necessary, for successful spruce regeneration. In theory the forest could wait until natural regeneration came in without assistance. In practice the regeneration would often be incomplete; it would come in slowly, and seed trees valuable

for timber of the highest quality would decrease in value and become mere fire wood. Even with very full seed crops some kind of assistance may have to be given natural regeneration usually for three reasons: (1) Because of a dense vegetable cover which prevents the seed coming in contact with the mineral soil; (2) Because of an excessive cover of undecomposed dead needles, or (3) Because the surface of the soil is too compact.

In the United States there are three schools of forest sentiment, or policy. The lovers of primeval forests want to spare all three for the sake of their beauty. They do not consider whether trees mature and die and go to waste. On the other extreme is the lumberman who buys forests for profit. After stripping off the merchantable timber he lets the soil take care of itself if he cannot sell to a land speculator. The state proposes the *via media*. Grow timber as a crop and cut the stand when it ripens. This should be the forester's golden rule. Let us profit by the example of a country like France, and use nature to help us in our task.



THE CROP OF OAK AFTER NATURAL REGENERATION

THE ANNUAL MEETING

RESOLUTIONS outlining the essential features of a national forest policy and calling upon Congress and State Legislature to give earnest consideration to legislative measures to secure such a policy were adopted at the annual meeting of the American Forestry Association, held in New York City on Tuesday, January 13.

The resolutions stated that:

WHEREAS, For nearly a year the American Forestry Association has urged the need of a national forest policy, has conducted a campaign for discussion of its various phases, and by nation-wide publicity has centered the attention of the public upon the necessity for such a

President Pack in calling the meeting to order complimented the members upon the fact that, despite the trials of war time, which caused many organizations, owing to loss of membership, to pass out of existence, the Association was able to hold its own, to retain its membership with losses which were replaced by new members and to approach the work during 1920 sound financially and stronger than ever before. He referred to the widespread publicity campaign which has aroused interest in forestry in every section of the country and to the great success of the campaign for stirring up the public to a realization of how essential it is to provide for the perpetuation of our forests.



AMERICAN FORESTRY ASSOCIATION DIRECTORS' MEETING, JANUARY 13, 1920.

Standing, left to right and facing the reader: Standish Chard, J. E. Jenks, Col. W. B. Greeley, Prof. H. H. Chapman. Seated, C. W. Lyman, Alfred Gaskill, President Charles Lathrop Pack, C. F. Quincy, Dr. Henry S. Drinker.

policy because our forests are disappearing faster than they are being reproduced. Be it

Resolved, That the American Forestry Association declare itself in favor of a material increase in federal, state and municipal forests and of adequate federal and state legislation which, through forest fire control, public education, the arrest of denudation and promotion of conservative cutting, more equitable tax laws and adequate insurance of forest investments shall provide for the perpetuation of our forests and assure a timber supply for our future needs as well as forests for the protection of watersheds and for purposes of recreation and public benefit;

And that the American Forestry Association call upon Congress and state legislatures to give earnest consideration to the need of a national forest policy and to legislative measures to secure it.

He also referred to the participation by an enthusiastic public in the planting of memorial trees, of roadside trees and of trees along "Roads of Remembrance," all earnestly advocated by the Association, and pointed out the value of this movement in directing attention to serious questions of forestry and in securing the support of the public for the program for a national forest policy.

He also emphasized the need, now so well known by the members of the Association and also by the general public, of providing for the perpetuation of the forests and predicted that the public demand for a national forest policy would result in securing the state and federal legislation necessary for such a policy.

On the presentation of the nominations for officers, Dr. Henry S. Drinker, President of Lehigh University, said:

"As a past president of the Association I desire to pay

our President, Mr. Pack, during the past three years, in the promotion of forestry interests in our country, and in the notable and valuable patriotic work done by him in the National War Garden Commission, a great war work, cognate to forestry, and carried on in close affiliation with our Association and under its auspices, but without a dollar of cost to the American Forestry Association. Also in the collection and presentation to France, Belgium and Great Britain without cost to the Association of tree seeds for reforesting the devastated areas. In the great war the United States put aside for the time all other interests to forward the cause of right and of world democracy. Our students left their studies, professors enrolled as war aids, clergymen served as chaplains, professional and business men put country before personal interest, and our American Forestry Association, under the leadership of Mr. Pack—and the United States Forest Service, under Colonel Graves and his able staff—showed by the work of the forestry regiments what an element of practical preparedness forestry had built up for avail in the time of national need.

"We have had at the head of the American Forestry Association a practical forester and lumberman in Mr. Pack, a business man of large experience and executive ability, and a gentleman of charming presence and tactful personality well fitted to forward and promote throughout our country interest in and support of the forestry cause, and we have in charge of our magazine, an editor, in Mr. Ridsdale, of great ability, untiring energy and resource.

"The American Forestry Association should not be run as an organization for the interest and edification only of its members who are professional foresters. It serves a great national educational mission in forestry through its wide membership and its well conducted magazine. If the Association was restricted to a purely professional membership and its magazine run as a technical journal, the influence of the Association among our people in promoting support for forestry in Congress and in our state legislatures and in combating measures antagonistic to forestry, would be very small. We owe it largely and mainly to the energy of Mr. Pack, and to his great personal liberality in the contribution of funds, that the Association has been able to organize so successful a campaign for enlargement of membership; and we further owe to him the telling publicity campaign for forestry and forest interests that has been so successful. We owe it today to ourselves to show Mr. Pack how we value and appreciate what he has done, and to give him our assurance of support in the continuance of his good and effective work."

The officers who were elected are:

President, Charles Lathrop Pack.

Vice-Presidents, Vincent Astor, New York; W. E. Colby, California; Coleman DuPont, Delaware; Dr.

Charles W. Eliot, Massachusetts; Dr. B. E. Fernow, Canada; E. G. Griggs, Washington; Henry S. Graves, District of Columbia; Hon. David Houston, District of Columbia; Hon. Franklin K. Lane, District of Columbia; Dr. John Grier Hibben, New Jersey; Hon. Robert P. Bass, New Hampshire; Stephen C. Mather, Illinois; Hon. Thomas Nelson Page, Virginia; Filbert Roth, Michigan; Dr. J. T. Rothrock, Pennsylvania; Mrs. John Dickinson Sherman, Illinois; Hon. William Howard Taft, Connecticut; Theodore N. Vail, New York; Hon. John W. Weeks, Massachusetts.

Board of Directors, Nelson C. Brown, New York; W. R. Brown, New Hampshire; H. H. Chapman, Connecticut; Standish Chard, New York; Hon. P. P. Claxton, District of Columbia; Dr. Henry S. Drinker, Pennsylvania; Alfred Gaskill, New Jersey; W. B. Greeley, District of Columbia; Chester W. Lyman, New York; Emerson McMillin, New York; Charles Lathrop Pack, New Jersey; Addison S. Pratt, New York; Charles F. Quincy, New York; E. A. Sterling, N. Y.; J. B. White, Missouri.

There was presented at the meeting by a committee consisting of E. F. Baldwin, R. S. Kellogg and P. S. Ridsdale, the following resolution:

WHEREAS, The National War Garden Commission, organized in March, 1917, by Charles Lathrop Pack, and conducted, directed and provided for financially by him until it ceased its war time activities on June 1, 1919, did a tremendous and unselfish public service in increasing the food supply of the United States during and following the war by inspiring the planting of over 5,285,000 war gardens and conserving great quantities of fruit and vegetables by canning and drying; and,

WHEREAS, The food thus produced was of the value of \$1,200,000,000; and,

WHEREAS, The Conservation Department of the American Forestry Association through its officers directed this work, the Association was enabled to conduct this great war time activity which made it known throughout the world. Be it

Resolved, That the members of the American Forestry Association express their gratification that it was the President of the Association who directed and led this war time activity which so greatly added to the war-needed assets of the nation, and for which as a far-sighted patriot he is entitled to the heartfelt thanks of his fellow-citizens.

At a directors meeting, preceding the annual meeting, plans for an international forestry congress were discussed. It was proposed that the Association hold such a congress during the coming summer, providing it will be convenient for delegates from Europe, South America, Canada, Japan and China to attend at that time. tribute of admiration today for the great work done by

DISCOVERY OF SUGAR ON DOUGLAS FIR

BY FRANCIS DICKIE

LONG before the first white man came to North America with his luxuries of sugar and tea and other food delicacies which today the Indians love, and long for when without, the Indians of at least one district on this great continent had a white sugar of a very rare and high quality, a sugar derived from the strangest, and an almost unbelievable source—from the foliage of the Douglas fir tree, growing in certain districts in the Province of British Columbia, Canada. Yet, remarkable as this botanical phenomenon is, the existence of sugar in such an unusual place as the foliage of a coniferous tree seems to have entirely escaped the attention of all the white traders, explorers, surveyors, missionaries and hunters who passed through the regions where it is found. At least no mention of it has ever come to light; nothing seems to have been written of it by those early pioneering whites who traveled through the region where the trees produce this sugar; and, undoubtedly, had these men known of it, they would most certainly have made some mention, because of the very unusualness of the occurrence.

So, in spite of the fact that this sugar has been known to and used by the Indians for a great many years, it is only now that the following interesting scientific facts of this phenomenon in the plant world are made available through the investigations and experiment of Professor John Davidson, F. L. S., F. B. S. E., Botanist in charge at the University of British Columbia, Vancouver, Canada, who has recently made a careful study of the sugar deposits on the fir, and the conditions under which it is formed, by visiting

some of the principal regions where grow these sugar bearing trees. Assisted by James Teit, of Spence's Bridge, British Columbia, who had spent the major portion of his years living in the interior of the Province, and who had an intimate knowledge of the country and the Indians, Professor Davidson gathered the data as to the districts where the sugar chiefly is found, the probable causes of it, and the other interesting matter which is the subject of this article, wherein for the first time the story of the discovery is made known to the general reading public.

The sugar appears in white masses of different sizes, ranging from a quarter of an inch to two inches in diameter. The smaller masses form like white drops at the tips of single leaves, and also at times several of the leaf tips are imbedded in a larger drop. Masses of greater size scatter over the leaves and branchlets. Placed in the mouth the sugar is exceedingly sweet, giving a flavor comparable to the highest class of the manufactured article. For a moment it passes into a pasty consistency in the mouth. But quickly becomes entirely soluble under the action of the saliva. It is quite hard and dry, but with no tendency to stickiness, after the manner of coarse flour. The accompanying photo taken by Professor Davidson, is of a good average



A RARE PHENOMENON—SUGAR ON FIR

The sugar appears in white masses of different sizes, ranging from a quarter of an inch to two inches in diameter. The smaller masses form like white drops at the tips of single leaves, while masses of greater size scatter over the leaves and branchlets.

specimen of the phenomenon as it occurs on the Douglas fir in British Columbia. A very light rain is, however, sufficient to dissolve the sugar off the fir; but very often it recrystallizes on the ground. At other times it remains in a semi-fluid condition, and its food value is evidenced by the fact that flies and various other insects are attract-

ed to it and feed upon it. The principal regions where Professor Davidson's investigations show the sugar to be produced are in the hottest and driest parts of the interior of British Columbia, between the 50th and 51st parallels, and between 121 and 122 longitude. These areas take in the Thompson River Valley, west of the mouth of the Nicola River, the district near the junction of the Fraser and Thompson Rivers at Lytton, and a small part of the Fraser Valley, above Lillooett. In the Kamloops district, the Nicola and Similkameen Valleys and the eastern part of the State of Washington it is also reported to occur.

On first viewing the phenomenon, Professor Davidson was inclined to think the sugar resulted from punctures made in the leaves by insects, probably aphides, as he knew the *Tamarix mannifera* yielded a mucilage-like sugar when attacked by the *Coccus*—as a result of which came the manna of Mt. Sinai. However, this idea was quickly dispelled when he found only healthy Douglas fir yielded a sugar harvest, ones practically free of any insect life. Thus the phenomenon was evidently the result of natural causes, turning the investigator's attention to an examination of hours of sunlight, amount of moisture usually existing and similar things. This resulted in the finding that in the above mentioned districts of the dry-belt on gentle slopes facing east and north in comparatively open areas where the fir trees got plenty of exposure to sun, the sugar producing trees chiefly grew. Where the firs stand densely, or where the trees are on fully exposed southern and western slopes the sugar is not generally found, as the ground in this latter area dries out very quickly. From this it was evident that moisture played an important part in the sugar's production when combined with certain requisites of sunlight. Where a great many leaves are exposed to the sun, as in the case of the firs standing on comparatively open areas on the slopes facing east and north, an abundant formation of carbohydrates occur in a day. In the ordinary course of nature's working these carbohydrates would be carried to the growing tissues or storage ones, which is the case on Douglas fir in heavily forested areas. But throughout the dry-belt region the trees receive a much greater amount of sunlight over a greater number of hours per day than in other localities where they grow. Here, in the dry-belt, the ground and atmosphere are also warmer, the air circulates more freely than in the coastal regions where the dense fir forests stand. Thus in the dry-belt where the firs are subjected to a long succession of unclouded days of blazing sunlight in summer, and where the soil condition provided warmth and moisture, the trees gather a great deal more carbohydrates than normally. The soil's increasing warmth over so great a period of sunlight permits the roots to maintain or increase activity and continue nocturnally. This increased root pressure, and cessation of transpiration, causes the leaves to become water-gorged. This water contains a sugar created by the reconversion of starch into sugar. But the warm, dry atmosphere existing even through the night in these dry-belt regions,

quickly evaporates the water, and the sugar remains to form drops of various sizes deposited at the leaf tips, some of which so large they fall onto branches and foliage below, resulting at times in irregular deposits as shown in the photograph.

By reason of the necessity for a succession of sunshiny days to produce the sugar, the Douglas fir of course does not yield a harvest that could annually be depended upon. For, a couple of wet days, or a few cloudy ones are sufficient to disarrange those atmospheric conditions which make the sugar possible. A cloudy day would permit the tree to utilize in the regular way much of the excess sugar and to horde the remaining portion as a future food reserve. A day or more marked by a drop in temperature would check the labor of the sugar-forming cells in the leaves, and the diminishing of the soil's heat lessen the root activity, causing a diminishing in the exudation of the water and a lowering of the root pressure. Similarly a day of rain would still more lower the soil temperature as well as that of the atmosphere. For these reasons the sugar cannot be depended upon to yield an annual harvest. This the Indians knew, and in good years stored up as much of the delicacy as was obtainable. The following analysis, made by Dr. F. T. Shutt, Dominion Chemist, Ottawa, Canada, and by the Bureau of Chemistry Washington, D. C., where there is a laboratory specially equipped for the examination of saccharine substances, are of great interest by the high degree of constancy of composition the fir sugar, or manna, showed. It is still more interesting owing to the finding that it contains a large percentage of an extremely rare variety of sugar; indeed, this particular variety is more abundant in the product of the Douglas fir than any other known plant. It was formerly obtained from a shrub in Turkestan and Persia. Of this pure and rare trisaccharide the Douglas fir sugar contains almost fifty per cent. Thus, while the fir sugar will never play a part as a food supply, like the product of the cane and beet, it will likely eventually prove valuable for use in chemistry, and perhaps in other ways which the scientific experimenting conducted by those interested in the discovery will bring to light. And in the heart of British Columbia the Indians will still gather it as they did before the white man came. Unique as the discovery is, it is further remarkable that so long a time elapsed before it attracted scientific attention as related herein. Perhaps the Indians intentionally held the fact a secret.

Of this Douglas fir manna, as it is called, the weekly bulletin of the Forest Service, District No. 1, at Missoula, Montana, says: "An interesting phenomenon which few of us have probably observed is the occurrence of 'fir-sugar' or Douglas fir manna, which is occasionally formed during summer droughts, or in dry-belt regions on the leaves and twigs of the Douglas fir.

"According to information from published records which have been furnished by Dr. Weir, the manna is not the result of the activities of insects, but is a natural exudation from the tips of the needles. The manna is

said to crystallize in some instances, cementing the twigs and leaves together in conspicuous masses. A slight rain quickly dissolves the manna from the branches and it may be found recrystallized in patches at the base of the tree.

"A letter from the Madison Laboratory states that the manna from Douglas fir contains about fifty per cent of a sugar known as melezitose, which in small quantities is selling at \$66 a pound. A correspondent had made a request for approximately ten pounds and estimated that three to five dollars per pound could be paid for the collection of this material. It was suggested by the Laboratory that on the basis of the price and yield of melezitose, a higher price than this might be paid.

"The Douglas fir manna cannot be relied upon as an annual crop. Dr. Weir has seen the manna but twice,

once in the fall of 1915 somewhere along the Yaak River on the Kootenai, and in 1916, when he observed and examined a white, sweetish exudation from the branches of a Douglas fir near Metalline, Washington. He doubts very much if it can be found in sufficient quantity for collecting in this region. A search for the material would necessarily be made during the dry periods of the year.

"In an article on 'Douglas Fir Sugar,' by Professor J. Davidson, of the University of British Columbia, it is reported that the region in which sugar-bearing Douglas firs are most abundant lies between the 50th and 51st parallels and between 121°-122° longitude. This includes the driest and hottest part of the dry-belt of British Columbia."

A FOREST FIRE

THE following word picture of a forest fire appears in the report of the Ontario Game and Fisheries Commission. It is a graphic description of the mighty tragedy:

"To the average man, no doubt, the reading of the destruction of miles of standing forests conveys but little of its true significance. He can hardly appreciate the gigantic figures arrayed before him as to the square feet of timber burnt or the estimated value of the same in millions of dollars. He may perhaps be aghast at the loss of life or suffering and hardships endured by those who were fortunate enough to escape their flames. He may even dimly realize that these people have lost their homes, their possessions, their all. But the effects on nature are as a closed book to him. He has not seen; he cannot understand.

"The stately forest, stretching unbroken for miles, harbors countless wild animals, birds and insects. Life, indeed, is seething in it. The soil on which it stands is nursed and enriched by its fallen foliage and trees, which in many instances cover even the bare rocks sufficiently to allow of the seeds taking root right over them and which form always a natural basin where the raindrops may fall and accumulate, to percolate subsequently into the crevices of the rocks, from which again they will appear in the form of a gushing spring. Just as on the even outpouring of the spring will depend the flow of the brook, the stream and the river, so does the spring itself depend on the existence of its damp and mossy forest reservoir for its waters. The forest fire is capable of destroying all: animals, birds, insects, vegetation and soil. The voice of the forest is hushed, and the death of the trees is not only accompanied by the annihilation of one of nature's great water storages, so vital to the prosperity of some perhaps far distant agricultural community, but by the disappearance of an important factor

in the regulation of both climate and rainfall over a considerable region.

"The picture of a forest destroyed by fire almost baffles description in its appalling horror. Unrelieved by the accustomed sounds, the cheerful note of songbirds, the chirruping of squirrels or chipmunks, the calls of animals or the humming of insects, deathly silence regains oppressive and supreme. Great trees and small trees alike, black, bare and gaunt, stand shivering as the breeze sighs a mournful dirge through their ranks, ghastly skeletons of nature's once beautiful handiwork, or else lie prostrate on the ground, charred, burnt and shrivelled, grim spectres of a useful past, proclaiming the passage of ruthless death, the advent of desolation and decay. No butterfly or moth flutters over the withered and blackened leaves; no little creature or insect crawls from among them, startled by the approaching footfalls. Far down into the accumulation of twigs and decaying vegetation which has formed the forest bed, into the mossy and spongy soil which in the past has held water to furnish life to the trees growing on it, the relentless fire has eaten its way and left its train a mass of useless cinders from which all nutriment has been utterly scorched. The human visitor to this tragic scene will have himself alone for company; will hear his own breathing; will be conscious of his own heartbeats; will be almost terrified at the sounds of his own footsteps; for life has been extinguished, the silence of the grave will surround him, and it will seem almost sacrilege to break the all pervading quiet of the dead. In due course the action of the winds will blow away the cinders, and the bare rocks over which once grew the forest will be exposed to view in all their unbeautiful and grim nakedness, and the region will remain barren and in all probability useless to man's welfare until, perhaps, after the lapse of centuries nature once again shall have succeeded with indomitable patience in recovering the rocks with a fresh soil."

THE WINTER ASPECT OF TREES

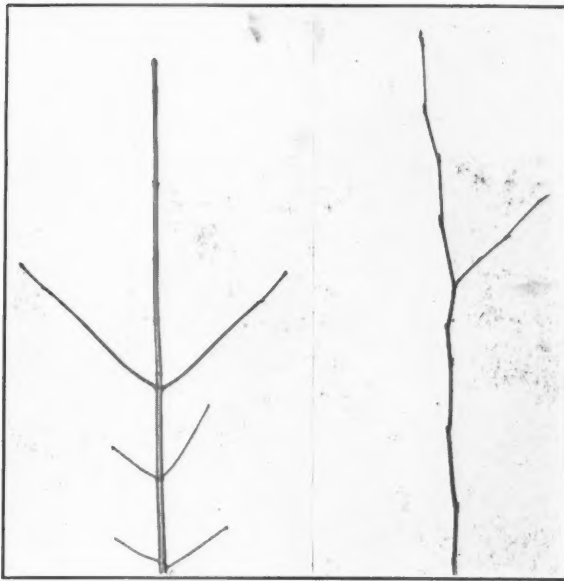
BY R. N. DAVIS

CURATOR OF EVERHART MUSEUM, SCRANTON, PENNSYLVANIA

ASIDE from occasional displays of the winter beauty of forests we are apt to think of trees in winter as dead and uninteresting. While it is true that the trees usually lack leaves, fruits and flowers during the winter season some of their other characters stand out more prominently at this time. In winter we can see the form of the tree and its method of branching much more clearly than when it is clothed with leaves. The color

of year is not a task but a great pleasure. If considered by groups it simplifies matters greatly. First of all consider the cone bearing trees. No one could have any difficulty in distinguishing these trees from all others. If we made the group of evergreen trees it would include almost the same species. The only native coniferous tree here which sheds all its leaves in autumn is the tamarack or American larch. The European larch is occasionally planted but can be distinguished from native species by its larger cones. In the far west there are two other species of larch. From Virginia southward the bald cypress is found in great abundance and this tree has received its name from the fact that it is bare of leaves in winter. With these few exceptions all our coniferous trees are evergreen. Of our broad leaved trees none are evergreen in this vicinity although there are some such species in the south and we have a number of shrubs which are evergreen.

In the immediate vicinity of Scranton we have but two



A STUDY IN BRANCHING

The white ash on the left has opposite branches. A ring around the stem just above the upper pair of branches marks the beginning of the year's growth. All the ashes and maples have opposite branches. The witch-hazel, shown on the right, has the two-ranked alternate arrangement of leaves, buds and branches. In this spray only one of the lateral buds of 1917 developed into a branch in 1918, all the buds below it remaining dormant.

and surface markings of the bark, too, stand out more distinctly in winter. An expert can tell almost any species of tree by an examination of the bark. The winter buds make an added feature of intense interest. What a wonderful difference there is in these embryo branches! The great buds of the horse-chestnut have a most elaborate arrangement for the protection of the delicate parts within. The baby flower cluster is covered by the downy growth of the undeveloped leaves. The latter are surrounded by the tough hard scales and these are varnished over to keep out the water. We can find all gradations from this most elaborate protective covering to those in which there seems to be but the slightest attempt at protection from the rigors of winter.

In northeastern Pennsylvania are nearly a hundred species of native forest trees. Probably very few equal areas have a greater wealth of species. Learning to recognize nearly all of these trees by sight at any time

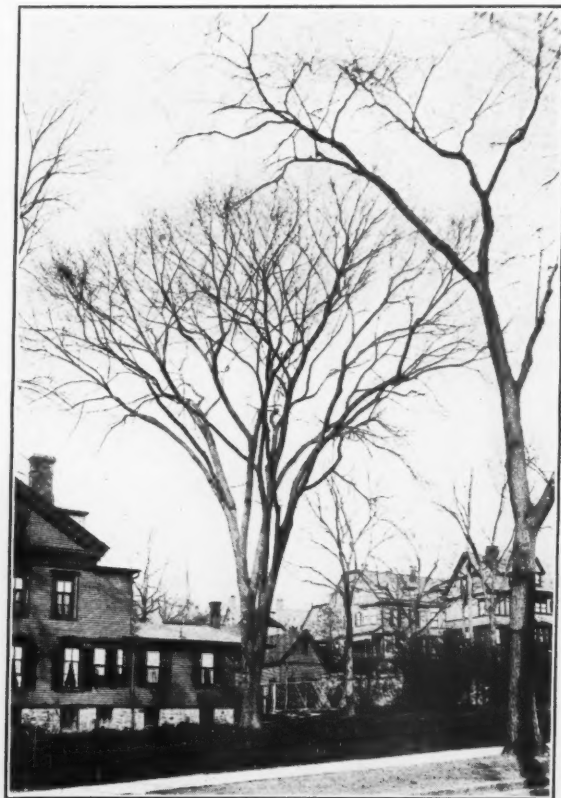


A SUGAR MAPLE GROWN IN THE OPEN

The form of the top of the sugar maple is unmistakable even at a great distance.

of pines, the white pine and the pitch pine. We do not have to go more than twenty miles to the south, however, to find occasional specimens of the scrub pine and a somewhat longer journey to the north will reveal the

red pine as a forest tree. Our native pines of north-eastern Pennsylvania may very readily be distinguished by their leaves alone. The white pine has very slender needles with five in a bundle. The pitch pine has three in each bundle while the other two species have only two leaves. These latter can be distinguished from one



THE AMERICAN ELM

The magnificent elm is the pride of many cities. It is one of the best of trees for shade and ornament.

another by the long leaves of the red pine and the short ones of the scrub pine. In other parts of our country where a different grouping of species occurs a somewhat different way of distinguishing them may be used.

The coniferous trees present much the same aspect in winter as in summer so let us turn to the deciduous trees, the ones which present such great contrasts in the two seasons. The arrangement of the buds and branches of these trees is what we should note in arranging them into groups. Buds form in the axils of leaves and so their arrangement is the same as that of the leaves. Trees have a definite plan in the placing of the leaves—just as definite as the carpenter's plan in arranging the shingles on a house. The shingles are placed so they will catch all the rain. Leaves are placed so they will catch the sunbeams and trees have different ways of arranging their leaves so they will do this work effectively. The catalpa tree has a way all its own. It places three leaves in a whorl and then at a little distance above there is another whorl so placed that the leaves will cover the spaces between the leaves below. In winter we can-

not see these leaves but the leaf scars show where they were and the buds just above add certainty to their location. If we find a tree with the buds arranged in this way on the vigorous shoots we may be assured it is one of the two species of catalpa.

The opposite arrangement of leaves, buds and branches is much more prevalent. All our maples and ashes have this characteristic. Horse-chestnut and the buckeyes also have the opposite arrangement although it is less apparent on account of the suppression of many of the buds by the deep shade. As this group of trees is rather small it is easy to distinguish the various species by other characters, especially by the appearance of the buds themselves and by the peculiarities of the bark. For instance, the red maple can be distinguished from all other maples by the reddish twigs, the whitish gray bark of the limbs and trunk until the latter reaches nearly a foot in diameter when it takes on a rough surface and becomes dark colored. The striped maple can be told at a glance by



THE YELLOW BIRCH

The bronze bark of the yellow birch distinguishes it from all our other trees.

the green and white stripes upon the bark which give the name to it.

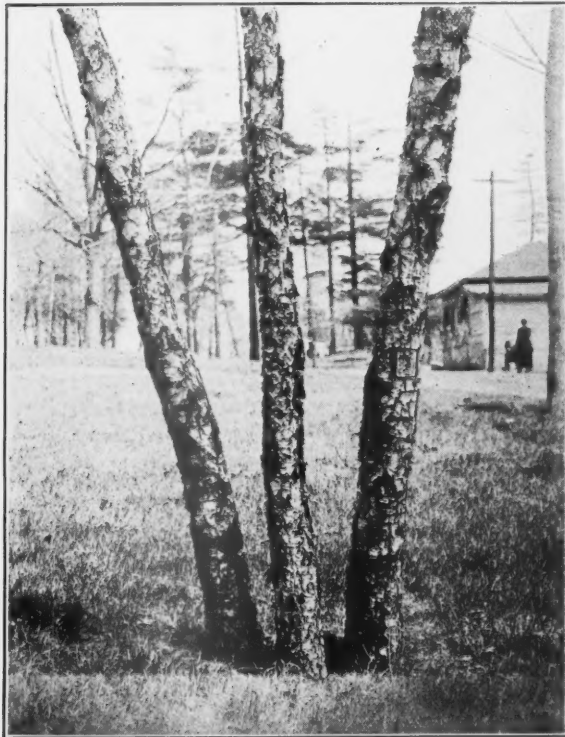
The hard or sugar maple is by far the most important of all the maples. The lumber is valuable for many purposes but the unique thing about the tree is the abundance of sweet sap which it furnishes. While all the maples have sweet sap none of the others are so important as sugar producers. This was appreciated in early times and a century and a quarter ago when the real estate men of that time were attempting to lure New

England men to these Pennsylvania lands "out west" they put on their map in big letters "The Sugar Tree Grows Here." Of course the manufacture of sugar from beet roots had not then developed and its manufacture from sugar cane was far less extensive that it is at present. A sugar tree was certainly some inducement and recently, during our war-time restrictions, one could ardently wish for a tree from which he could gather sugar.

The sugar maple makes one of the very best shade and ornamental trees. A row of these trees along a country road gives comfort to the traveler and beauty to the landscape. Even in winter one of these open grown trees can be distinguished at a great distance by the outline of the top and the way the branches radiate.

The white maple is planted extensively as a shade tree since it is easy to start and grows rapidly. Its natural habitat is usually along streams but it readily grows when planted in other situations. It is the earliest of all the maples to bloom and the blossom buds in

one and consequently there is a two ranked arrangement of the leaves and the resulting buds and branches. One does not need to make a close examination of the elm in order to recognize it. As far as one can see the gracefully arching branches proclaim this tree which Micheaux called "the most magnificent vegetable of the temperate zone." We may not agree with him in this rather extravagant praise yet there is probably no other tree so



THE RED BIRCH

This tree sometimes grows in clumps as shown in this picture. The most prominent characteristic, however, is the salmon colored bark composed of very thin loose layers. As the trunk gets larger it loses this peculiarity and becomes much like the bark of the black birch.

mid-winter will distinguish this tree from all its relatives since they are so much larger. Another characteristic that will serve to identify it is the upward turn to the twigs.

By far the largest group of trees is made up of those which bear but one leaf at a given level on the stem. Some of these, as the witch-hazel and the elm, have the second leaf half way around the stem from the first



THE WHITE BIRCH

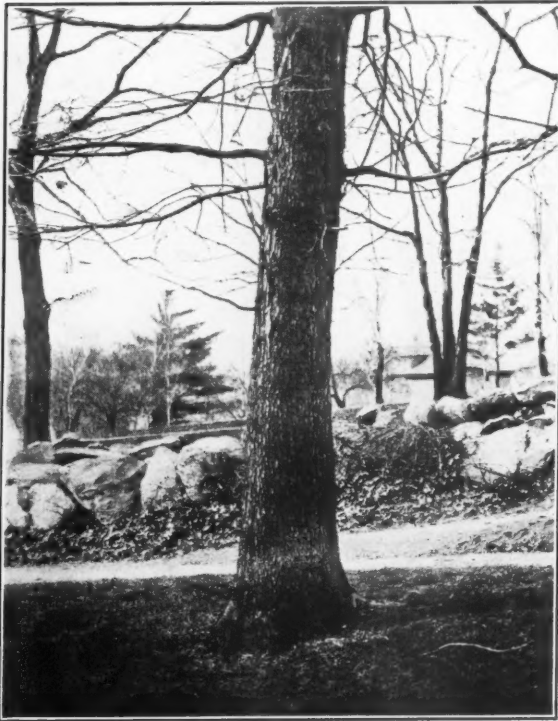
Notice the black triangular patch at the base of each branch of the white birch. The habit of growing in clumps is well illustrated here.

generally planted in America for shade and ornament.

It may be well to observe here that most of the trees having but one leaf at a given level have each succeeding leaf two-fifths of the distance around the stem from its predecessor. In the elm with the second leaf half way around the stem from the first we can see that the leaves and the resultant buds form two rows or ranks along the stem. In the maple and ashes with their opposite leaves and buds the second pair is set at right angles to the first so that we have four ranks to the leaves, buds and branches. In the numerous trees where each succeeding leaf is two-fifths of the way around the stem we can readily see that there must be five ranks of leaves. Finally, in the catalpas with the whorl of three leaves and the next whorl set to cover the joints in the first there must be six ranks. Of course, one must examine a quick growing shoot that is fully exposed to the light and air on all sides to see these plans fully worked out. Usually by the suppression of leaves by shade of neighboring parts or by the twisting of the stem

it is somewhat difficult to determine the plan in the arrangement of leaves, buds and branches.

The birches form an interesting natural group of trees. In winter the cylindrical bud that is destined to develop into the catkin of staminate flowers is quite noticeable. The pistillate bud is not so prominent but may be found by a little searching. The birches can be distinguished from one another by the appearance of the bark alone.



THE WHITE OAK

The bark of the white oak clearly distinguishes it from all its relatives.

The most common of these trees is the black birch, so called on account of the stem being darker colored than that of any of the other species.

The yellowish bronze color gives the name to the yellow birch while the white color of the bark gives the name to another common species. This white birch is especially abundant in burned-over areas, the small seeds being carried to a considerable distance by the wind. The European white birch is a closely related species frequently planted about town as an ornament. The pendent twigs of this species and the less prominent triangular black spot at the base of each limb will distinguish this European species from our native white birch.

Northeastern Pennsylvania is about the northern limit of the red or river birch. This is essentially a southern tree but along our streams it grows in considerable abundance. The freedom with which the outer bark peels off in layers together with its reddish color will distinguish this tree from any other. We are just at the southern limit of another noted birch tree, the paper or canoe birch. It is only along the northern slopes of our mountains that this tree can find a congenial home.

Farther north it forms an important part of the forest. Paper birch wood is devoted to several unique uses. Almost every spool for sewing thread is made of paper birch. Nearly all wooden toothpicks are made from it. Formerly it was used to make shoe pegs so that while it was then under everybody's foot now it is in everybody's mouth. It was the bark of this species that the Indians used to make their light canoes. Of the ten known species of birch in North America these five are probably the most important.

The oaks form another important group of trees in our region. All oaks agree in bearing acorns but in winter this is not always apparent for some species mature the fruit in one year and it falls to the ground. Others have the slightly developed acorns on the branches in winter and these come to maturity in the following summer. The barks of the various oaks present some interesting contrasts. The light colored and slightly



THE CHESTNUT OAK

The deep fissures and high ridges of the bark of the chestnut oak are remarkable.

roughened bark of the white oak is very different from the bark of the chestnut oak with its high ridges and deep fissures.

One of our most interesting and most valuable forest trees is the tulip tree. In summer we could distinguish this fine tree from any other species by the form of the leaves. They seem to be cut off at the apex at right angles to the midrib. The large greenish yellow flowers also distinguish this tree from all others. In winter the tall straight trunk suggests the species and if we can get a view of the winter buds we can perhaps dissect them enough to identify the peculiar form of the unde-

veloped leaves. This tree furnishes the valuable lumber known among builders as "whitewood," "poplar," or "yellow poplar." It is one of the most satisfactory shade and ornamental trees.

An interesting study of trees is to trace the annual growth by the rings left on the branches by the bud scales. On red maples growing slowly I have been able to trace back the growth from year to year for a full

the limb and count the annual wood layers. Of course, the two results should agree. As the growth of the tree continues the swelling bark obliterates the rings made by the bud scales and one cannot usually trace the



THE PAPER BIRCH

The outer bark of this birch is used for canoes. This was the best material the Indians could find for this purpose. It is a beautiful tree and when mixed with other forest trees the contrast is striking.

decade. For preliminary practice in this amusement it is well to take limbs that have been cut off in pruning operations and after one has counted the age of a branch by observing the rings on the bark he can cut across



BEECH

Although the beech is not valued as a lumber tree the smooth gray bark lends a charm to the tree as it stands in the forest.

growth for more than four or five years although there may be cases where the segments can be identified for a dozen years.

INTERCOLLEGIATE ASSOCIATION OF FORESTRY CLUBS MEETS

AT the Yale School of Forestry, New Haven, Connecticut, on February 26-27, the fourth annual convention of the Intercollegiate Association of Forestry Clubs will be held. Delegates from the various forestry schools will be present and also it is planned to have a large number of prominent practicing foresters and lumbermen address the meeting.

Great emphasis will be placed at the meeting on the discussion of forest education and forest policy.

The Association was founded at Cornell University in 1914 and conventions have been held at that university, the University of Michigan and the University of Washington.

At present practically all the forestry clubs of the various universities teaching forestry are members of the Association. All interested are invited to attend the meeting.

TICKS AND TIMBER

BY AUSTIN CARY

IN CHARGE, CO-OPERATION WITH PRIVATE TIMBERLAND OWNERS, UNITED STATES FOREST SERVICE

THE South has not figured largely in the calculations of foresters. In fact, as compared with the Northeast, which is much farther advanced commercially, and with the West, where the National Forests are located, it has received but scant attention. It is, however, a land of great interest and promise.

The vast extent to which good land in the South is still unutilized has been lately brought to public attention through the movement for soldier's homes. Most people, probably, have lately acquired some sense of a new industrial life now stirring through that region. This new activity is along two main lines — manufactures of various kinds, and new uses for land.

Men are discovering that southern lands have resources not previously valued, and that proper treatment may develop these to a usefulness never before dreamed of. At one point and another, and in one direction and another, therefore, thought and enterprise are now reaching out for the utilization of opportunities. This movement is in its inception as yet, but under the pressure of economic forces and the steadily maintained push of American business men, it seems destined to make of the South "the next West," as some

have expressed it. Of the new uses for land, grazing is today most prominent, and hundreds of enterprises are starting. Its large success depends on the extermination of the cattle tick, a long-standing pest of the South, which brings to naught all efforts to improve the strain of cattle,

kills many of the animals, and stunts the growth of all. Eradication of the tick is essential for a successful grazing industry. Fortunately, the foundation of scientific investigation was laid years ago, the execution of plans has already made good progress, and within a few years success promises to be complete.

Great should be the reward of those who have led in that work at its different stages, for they have not only freed southern cattle of a tremendous handicap, but they have taken a load off the energies of a host of men. The new life and spirit

of enterprise where that incubus is removed are noteworthy.

Not least, perhaps, of the results of this housecleaning, though not very strongly in evidence as yet, will be the effect on the forest interests of the region. These will gain with the new stimulation of thought; but there are special channels through which benefit will flow,



ABOVE: THE GOOD AND THE POOR IN CLOSE PROXIMITY. 17 YEAR OLD SLASH PINES UP TO 8 INCHES IN DIAMETER AND 45 FEET TALL; PROMISING TO YIELD 15 YEARS FROM NOW TEN TIMES AS MUCH NAVAL STORES AND LUMBER AS THE OTHER SITE.

BELOW: THE TREES, THOUGH PROBABLY 150 YEARS OLD, ARE ONLY 50 FEET TALL, AND THE STAND 1200 FEET PER ACRE. SOIL MAKES THE DIFFERENCE.



determined by the methods and economics, new and old, of the grazing industry. The contrast between new and old is great indeed. There had always been a southern cattle industry, but people in those sections of the country constituting the great markets had seldom heard of it. It was, in fact, a poor and shiftless thing. Cattle

one thing, and demands release from the anxiety and damage it has suffered in the past. Growing timber is beginning to be considered, as the leaders in industry sound a warning about waning virgin supplies. Managers of the grazing industry have found out that, while fire might temporarily improve feed, valuable plants are thus driven out, and production is decreased in quality and volume. Above all, the improved stock, certain to be introduced as the tick is driven out, would not thrive on such treatment. Winter feeding, greatly improved pastures, a smaller area used for grazing because of that fact, promise to be the features of the new time; and, with that, the demand for fire will become less insistent, and its use finally be reduced to the occasional.

Thus does one thing affect another. As economic conditions change in one field, an influence, frequently of great power for good, beginning there, spreads through other areas. However, these questions remain: how

ran on the open range without selection or care, were bled and diseased by ticks, and weighed at maturity but 300 to 700 pounds. In the late winter of each year they came near the point of actual starvation. Such an industry did not produce the meat sought after in discriminating markets.

In this method, too, a matter of great significance for forest growth was involved, for fire in a measure kept the ticks down, while, to secure in the starving season feed that was fresh and unmixd with the dry growth of the preceding year, fire again was useful. Thus, beginning in Florida in January, and working north through the pine belt in February and March, swept the annual fires. Most residents of the country owned cattle, and so were interested in the yearly burning. The nature of the cover was such that great, devastating conflagrations like those of Minnesota were not to be feared. For a long time, forests were so extensive and timber so abundant and cheap that results in that direction were hardly considered at all. Thus the custom of a people became established.

Times have changed now, or are changing, and in many fields. Agriculture is more intensive and scientific, for

much will the South gain in respect to its timber resources? What has she to start with now, or what will spring up anew, as a result of this changed relationship.

A candid answer admits that there is great local variation, but claims that, on the whole, a very great gain



STARTING IN A DRAINED CYPRESS SWAMP, STILL WET, FIRE COULD NOT DESTROY SLASH PINE SEEDS AND SEEDLINGS. AFTER 25 YEARS THERE IS A STAND OF 60 CORDS PER ACRE.

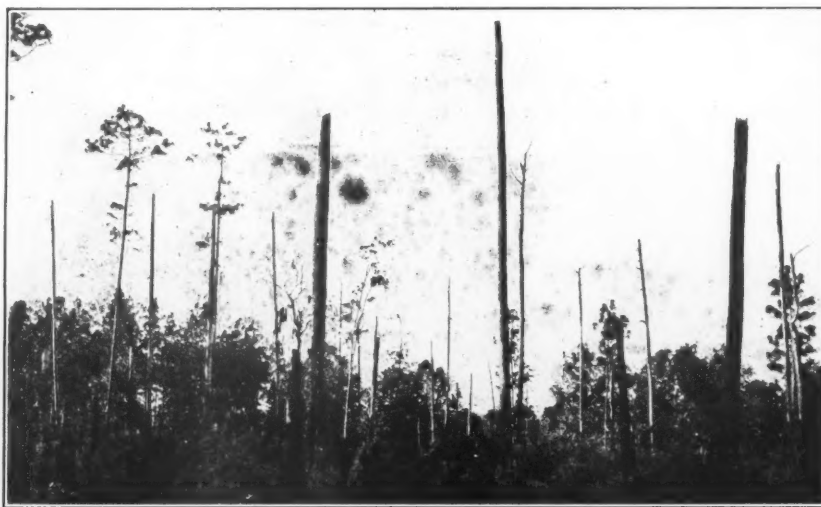


DESTRUCTIVE TURPENTINING. TREE TRUNKS CUT INTO DEEPLY BY "FACES" OPPOSITE ONE ANOTHER HAVE BROKEN OFF.

may be expected. When we think of the tremendous area involved (a writer has lately noted that the Gulf States alone exceed Germany, Holland, Great Britain, Japan and Formosa taken together) any gain that is general in this section becomes of moment to the whole nation. Added to the vastness of the area, are natural

conditions of great potency—a variety of serviceable and strongly reproducing trees, a long growing season, and soils that are fresh and unimpaired. Great contrasts are found, however, and these contrasts are not seldom exhibited within small spaces. Soil conditions are all-important. Texture, relation to clay or hard pan, depth of the water table, content of lime—these things, in their different degrees and combinations, affect vegetation to a marvelous degree. They mark off different types by sharp lines; they decrease or increase vastly the rate of wood

production. This condition, for the man contemplating enterprise, in timber or another line, constitutes both challenge and opportunity. Of this diversity, no part of the South is more illustrative than Florida. The rich and the poor lands frequently lie side by side, with enormous differences in productivity. Some of these differences, together with a partial understanding of



TWENTY THOUSAND FEET PER ACRE OF LONGLEAF PINE TIMBER DESTROYED BY TURPENTINING AND THE FOLLOWING FIRES.

phenomena in a broad way (no tropical features are, however, included) may be gathered from the photographs.

PAPER FAMINE IF FORESTS ARE WASTED

IN less than 20 years 95 per cent of the pulp and paper mills of the country, mainly those in the East, will have practically exhausted their supplies of spruce, hemlock and fir—the principal woods from which the paper on which newspapers are printed is made.

The annual cutting of these woods in the New England States and New York is approximately 3,262,000 cords, and at this rate the supply will last approximately 17 years. The estimated annual cutting in the Lake States is 3,030,000 cords, and if continued will exhaust the supply in that region within 18 years. Pennsylvania, Maryland, Virginia, and North Carolina, with their smaller forest resources, are even worse off, the annual cutting being calculated at 1,470,000 cords, at which rate the spruce, hemlock and fir will last but ten years. Only in Alaska, Washington, Oregon and California are the reserves in no immediate danger of exhaustion if the cutting continues at the present rate of 2,218,000 cords a year.

These figures, of special interest because of the present paper shortage, are included in estimates compiled by the Forest Service of the United States Department of Agriculture. The data accumulated gives additional emphasis to the demand for a nation-wide policy that will put privately owned forests on a permanently productive basis and will also result in utilizing mill waste for paper making.

Even if the country's hemlock, spruce and fir resources, including the vast forests of far-off Alaska, are lumped together, the supply of these woods will be sufficient to meet the lumber and paper demands for less than three-fourths of a century, assuming that the present rate of cutting continues. At first glance it might seem that a national supply for three-fourths of a century makes it unnecessary to worry over the lumber question for some time. But, as already stated, 95 per cent of the pulp and paper mills are located in the East; these are very expensive establishments, often costing millions of dollars, and can not be moved conveniently to new locations, nor can wood be shipped to them economically from great distances. Consequently talk of easily utilizing the far-off reserves is impracticable unless the present mills are to be scrapped and new ones built nearer the source of supply.

Up to ten years ago the United States was self-supporting with regard to newsprint, but within the last decade the consumption has exceeded home production and promises to do so increasingly. In view of this situation two alternatives present themselves, according to Forest Service experts and representatives of large wood-using industries. The country must depend increasingly upon Canada, eventually abandoning many of its own mills, or the nation's policy with regard to its private forests must be radically changed. Canada now has 90 paper and

pulp mills which produce approximately 2,100 tons of paper a day, of which 89 per cent is available for export. Of all supplies of paper, wood and pulp used by the United States about one-third now comes from Canada.

While the supplies of pulp wood in Alaska and the Northwest are very great, only about five per cent of the mills are located in those regions. So long as publishers can obtain Canadian paper more cheaply than they can get it from the West, it is to be expected that they will buy from Canada. Nevertheless, there are several factors which should gradually bring western paper into competition with the eastern Canadian product, according to forest experts. There are quantities of wood in the West available at stumpage prices much less than in the Northeast. Much of this wood is on the National Forests, and, therefore, is available without the carrying charges that must be figured against large investments in land. Furthermore, the yield per acre of forests is much greater in the West than in the eastern Canadian forests, and there are large water powers available in the West. Certain disadvantages, such as high wages and high freight charges, must be recognized in considering the supplies in the West, but it is believed that these do not counteract the advantages.

The Forest Service points out, however, that whether paper interests rely upon Canada, or upon increased use of our western resources, in either case these are temporary expedients. In the long run the country must solve the paper problem on the basis of a *permanent* wood supply. To this end it is urged that mill waste be utilized for paper making and that the forests of this country be regenerated and administered on a more productive basis.

Mill waste, including slabs and edgings, is well adapted for paper making by one of the three chemical processes now commonly employed. But only about three per cent of the wood used for pulp is mill waste, and this is evidently a very small portion of all the slabs and edgings from spruce, fir and hemlock now being made into lumber. Here, undoubtedly, is a big field for development, as it is estimated that there must be an annual waste of 1,600,000 cords of these species alone.

Even more important than the utilization of mill waste is the regeneration of the forests for the perpetuation of the paper industry in the United States. The policy of wastefully cutting the forests and making little provision for future growth must be abandoned speedily, say forest experts. In the future, operations should be so conducted as to secure increasing reproduction of trees valuable for lumber and pulp. Fortunately such species as fir and poplar are prolific seeders and may be reproduced naturally. Spruce may be reproduced under proper methods of forest management, though with more difficulty. As the cost of pulp wood increases, investments in plantations, especially in the neighborhood of pulp mills, will commend themselves. The growing of large quantities of wood close to the mills will greatly reduce the cost of lumbering and transportation. Young, thrifty, grow-

ing forests will produce yields scarcely imagined by one who has been accustomed to deal exclusively with old timber. It is urgently recommended that in this connection the practice of Sweden be given serious consideration. In that country the mills employ technically trained foresters who prepare accurate figures concerning the yearly growth of the forests which serve as a rigid basis for the annual cut of timber.

It is the wood-using industries, rather than the lumber companies, that are especially interested in applying conservation to the national lumber supply, according to the Forest Service. Likewise, it is the publishers rather than the pulp companies which must eventually pay the penalty for wasteful lumbering and which must, therefore, take it upon themselves to guarantee the perpetuation of the nation's pulp supplies.

FORESTS IN JAPAN

"THE United States may well imitate Japan in the care with which it enforces its forest conservation laws," says a well-informed teacher much interested in forestry problems, who has recently returned from the Orient. "In Japan, all the wooded land is carefully guarded, practically every tree on the government forest land is listed and not one is allowed to be cut down except with express permission of the government, and then not unless another tree is at once planted in its place."

About four-sevenths of the forests of Japan are owned by the state. As is well known, Japan is not much of an agricultural country, its farms being very small and intensively cultivated, but the greater part of the country is occupied by mountains largely covered by forests. It has about 50,000,00 acres of forest land, including cedars, pines, cypresses and firs, with some oaks, maples, beeches, willows, etc. Few of the trees, however, attain a great size, and for large dimensions and long lengths of timber Japan imports wood from America.

One of the interesting and grotesque sights in Japanese parks and houseyards is the presence of many deformed trees—those twisted into human or animal shapes. Some of these deformed trees are very small, so that they may be placed on a windowledge, and for such bizarre plants the equivalent of perhaps two thousand dollars will be paid.

But little wood is used in Japan for dwellings, because they are usually simple in structure, have paper walls, doors of square lattice work covered with paper and such building makeshifts.

Much lumber is used in jinrikisha and match factories, of which there are many. Enormous numbers of matches are made each year, mostly for Oriental trade, this being one of Japan's principal industries. Her great shipbuilding yards require a large amount of lumber and her pretentious shipbuilding program for 1919 promises greatly to increase the demand for both native and imported lumber.

THE OPOSSUMS

BY DR. R. W. SHUFELDT, C. M. Z. S.

AT THE present time opossums may be found in suitable localities from New York to northern Florida, and as far westward as Texas; it is said that they seem to be extending their range somewhat to the northward. In scientific and in popular literature few American mammals have figured more frequently, its great rival being without question the racoon. 'Possum hunts have taken place all over the South ever since the country was settled, and the incidents which have occurred during these exciting times have furnished food for song and story since the days of the colonies.

Throughout the South 'possum is held in high esteem for its flesh, but more particularly by the negroes, and by them the animal is most persistently hunted. Being largely nocturnal in its habits, these stirring affairs usually take place at night, when a party is formed, the dogs mustered, and the hunters, armed with sticks and guided by torches and lanterns, start out, a merry party, for the forests known to be haunted by these cunning marauders. The barking dogs are employed to tree the 'possums, who, in their fright, will shin up anything from the weakest sapling to a big gum tree or pecan. In any event, either the victim must be shaken out, or one of the party must climb up and shove him out, and to this the irritated animal often seriously objects, snapping and growling at his assailant like a big rat—indeed, at such times he is not

unlike one of them. However, sooner or later down he must come. As he strikes the ground he changes his tactics entirely, and immediately feigns death in a manner so perfect as often to deceive those familiar with this trait of the animal. However, in his present predicament this is of no avail, for one of the hunters quickly pins him down, back uppermost, by placing a stick across his neck, and holding him down dislocates his neck. Then, bagging the game, with a shout the party takes a fresh start, and the dogs search for another trail.

Mr. Ernest Harold Baynes, who has published some very entertaining chapters about opossums, said of the species that "speed he has none, his fastest gait being a sort of pacing movement which he can sometimes be

forced into; but his cunning is so great that he can frequently give his enemies the slip. Sometimes he attempts to evade his pursuers by changing his direction, running back along his own trail, and thus throwing them off the scent. But his favorite trick consists of pretending he is dead—a ruse known the world over as 'possuming' or 'playing 'possum.' He does this so cleverly that many people to whom the trick was known have gone away and allowed him to escape under the impression that 'this time, at any rate, he really was dead.' No amount of physical pain can make him betray himself; and it sometimes seems impossible that any animal could submit to the torture he has at times been subjected to."

A number of years ago, the writer had a female opossum in captivity for a long time, and she gave him the opportunity of studying many of the habits of the animal. At the time she was taken she had nine young ones, each about the size of a rat one-third grown. On different occasions photographs were obtained of all of them, those of the mother not being particularly good, but successful in the case of the young. One of the latter illustrate the present article.

Speaking of the young, it is a well-known fact that the opossum is a wonderfully prolific animal, producing all the way from six to seventeen at a birth, and often—in the South—breeding as many as three times a year.

The young are born at a very early stage of their development, and weigh but from three to four grains each, being quite hairless, and their eyes tightly closed. As fast as they appear, the mother shoves them into her marsupial pouch with her snout, where each quickly seizes onto a nipple; here they are nursed and grow with great rapidity. At the end of a week they are said to weigh thirty grains each; and by the time a month has passed, they occasionally climb in and out of the pouch, being at this time the cutest little creatures imaginable. In nature, an old opossum is known to take very good care of her litter; but for some reason they appear to be rather neglectful when in captivity.

Confirming what is said above, a writer at hand



A FULL GROWN VIRGINIA OPOSSUM. ABOUT ONE-FOURTH THE SIZE OF LIFE. ANIMAL LOANED BY MR. EDWARD S. SCHMID, OF WASHINGTON, D. C. PHOTO FROM LIFE BY THE WRITER

Fig. 1. This cut gives an excellent idea of the appearance of the animal making his way on a small limb, also the expression of concern at having reached the end of it, with no chance of escape from his pursuers.

remarks that, when they commence to venture forth, they "keep close to the mother, and hold on to her by their tails. Sometimes, with a dozen young ones the size of rats thus clinging to her legs, neck and body, and some of them dragging along on the ground, she may be seen going about in search of food. At this age these animals are pretty; they remain with the mother till



YOUNG OF THE VIRGINIA OPOSSUM, ONE OF A BROOD OWNED BY THE WRITER, AND PHOTOGRAPHED BY HIM FROM LIFE.

Fig. 2. Note that even at this tender age the end of the tail exhibits the foreshadowing of the ability of the animal to use it as an aid in climbing later on.

about two months old, then they learn to take care of themselves, but continue in the vicinity, seeming still to be under maternal guardianship in a certain degree." In the meantime, be it said, another litter may be produced—sometimes even a third. These, too, grow rapidly, and it is an interesting sight to see, later on, the prolific parent, surrounded by several representatives of all three of the broods, in her efforts to look after them properly, each according to its needs.

The opossum has a typically prehensile tail, a faculty that it chiefly brings into use during its life among the trees and in other places when on the ground. In climbing, it constantly uses its tail, swinging from one small limb to another, and it has the habit of suspending itself by the tail when feeding upon some fruit or other growing below its perch. Opossums, like the racoons, are very fond of grapes, and delight in regaling themselves upon persimmons when these are rich and ripe in the autumn, especially after the first frost. Moreover, they are partial to poultry, and will rob the hen-roosts with as much adroitness as a mink, or as that old adept in

that calling—the skunk. In fact, the animal is in reality an all-around omnivorous mammal, and will, if hard pressed, also devour fish, mollusks, and various things on the bill-of-fare. It can also go for a considerable time deprived of both water and food.

So it will be seen that, with its marvelous tenacity of life, its prolific breeding, its extraordinary endurance under varying conditions of temperature, and its capacity to live and thrive upon anything eaten by any other creature under the sun, the opossum's chance to multiply and be a winner in the great struggle for existence are indeed excellent.

When winter comes, the opossum makes a nest for itself somewhere, either in the trunk of a hollow tree or in some similar situation, and passes the cold part of the year in a state of semi-torpority. This hibernation, however, is never as profound as the one entered upon by the woodchuck, the bears, and other animals. In referring



AN OPOSSUM AS HE APPEARS IN HIS OWN NATIVE WOODS IN THE WINTER TIME

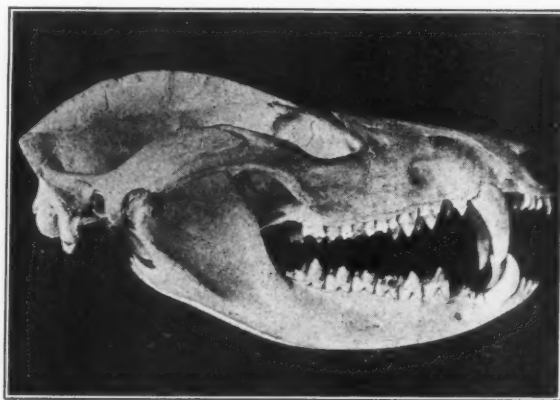
Fig. 3. Through the courtesy of Mr. Ned Hollister, Superintendent of the National Zoological Park, where the specimen here shown belongs, the writer was given the opportunity to make this photograph within the precincts of that reservation.

to the footprints it leaves upon the snow, Baynes describes them in the following words: "Wherever the opossum occurs, its presence is indicated by its curious footprints on the ground, strange, uncanny footprints, which rivet the attention of every man who sees them for the first time, whether he is interested in natural history or not. They do not resemble the tracks of any other of our wild creatures; they look as though they might have been made by the hands and feet of some misshapen gnome or dwarf. They are most clearly seen upon the snow in the early winter; after that the animal sleeps part of its time in some snug retreat." In fact, the hand-like feet of the opossum will even attract the

attention of the tyro the first time a specimen of the animal is examined. And, in helping itself to food—be its nature what it may—it sometimes holds onto its resting-limb by means of its tail, while it employs these hand-like hind paws in manipulating the morsels it passes to its capacious maw. Being, as has been said, quite nocturnal in its habits, the opossum will spend most of the day curled up in some burrow, hollow log or stump, or even secreted in the dense foliage of some tree or other. Nevertheless, the old fellow will sometimes steal out in broad daylight—although more likely on a gray day—for a prowl about the woods, the orchard, or the hen-yard. On such occasions he will, in a sluggish way, climb among the limbs of trees; and should he spy some birds' nest, containing a clutch of dainty blue and speckled eggs, he will, without any compunction, swing himself down by the tail and deliberately rob the rightful owner of its treasures, picking them out, one at a time, and devouring them, still swinging by his handy tail, and suspended in midair. Sometimes he will surprise and capture some unhappy squirrel in its hole. Seizing his struggling victim, he will bite it in the back of its neck as quickly as he would a hapless chicken on its roost in the night-time, devouring it with evident relish. Lizards and many insects meet with the same fate when he can capture them; and it is said that, when in a tight place and deprived of food for any length of time—perhaps facing starvation—he will, rather than succumb to such a fate, eat his own young, or even gnaw off his own tail and toes, making a meal of them.

Although often savage, cross, and snarly, the opossum nevertheless enjoys its playtimes. Two old fellows will frequently engage in a regular romp, rolling over each

other, tugging away with their tails, yanking at each other's fur with all four paws, and biting each other in fun until the operation borders close upon no make-believe encounter. On a hot, sunny day, occasionally one will take a notion to stretch himself out on his back on a broad limb; with his tail hanging down, and his



SKULL OF AN OLD VIRGINIA OPOSSUM, SEEN ON RIGHT SIDE VIEW. PHOTO BY THE WRITER

Fig. 6. This cut well shows the formidable set of teeth possessed by this animal. Note how complicated the molars are, and that the canines resemble those of a small dog.

feet resting upon his nether parts, he will lie basking in the sun for an hour or more at a time.

The old female opossum, which with her young the writer once had in his possession, fed sparingly upon raw flesh of various kinds, and would drink about a pint of milk in the course of twenty-four hours, her repast being generally indulged in at night. She did not appear to be very solicitous of her young, and made barely any resistance when one picked them up to examine them. Frequently she would roll partly up into a ball; then, when one of her young was taken from her, she simply gave vent to a kind of guttural hiss, accompanied by a sort of a grin. Shortly after coming into the writer's possession, she killed one of her brood—through carelessness, I believe—while one or two more fell into the drinking water or milk and were drowned. She did not seem to care very much, nor did she, apparently, make any attempt to rescue them. Her young, when fully as large as small rats, would nurse her many times a day, sometimes three or four of them attaching themselves to her teats at the same time, sprawling over each other, some being inside her pouch,



AN OLD OPOSSUM AT EVENTIDE. PHOTO BY THE WRITER

Fig. 5. One can easily imagine the behavior exhibited on the part of this shy old representative of his race, as he makes his way about in the long grass of the thicket in search of food.

some partly in it, and others having their heads just within the hairy margins of its entrance.

These young opossums were extremely difficult to photograph from the fact that they were so restless when taken away from their mother; they were not sprightly at all—simply sluggishly on the move; first gaping, then twitching their ears, or curling up their tails. Finally, when kept from the mother too long, they would commence to shiver all over.

If there be such a thing in nature as "a chip of the old block," then we must assuredly find it in the young opossum—any one of these little fellows was the veriest "chip" alive of its sleepy, old parent. It would walk along a twig just as the mother progressed upon a larger branch, holding on in the same curious manner

black, and twinkling. The mouth has a capacious gape, and the entire face and snout are pointed as in the old one. By the use of the tail and feet, these young opossums are able to hang onto the coat of the mother; and when they all get into the hair of her back, they present a very odd and amusing picture, to say nothing of the enjoyment they exhibit—howbeit, it was shown in such a sleepy way.

Mr. A. Radclyffe Dugmore gives an account of two of these animals that enjoyed a friendly ramble about the barnyard of a farm during a gray day, when the farmer and others had gone to the polls to vote, and there were none about to interrupt their investigations. The animals are designated as 'Possum One and 'Possum Two, and the sequel goes to show that in reality they



A PAIR OF VIRGINIA EXPERTS AT THEIR OLD GAME OF "PLAYING 'POSSUM." PHOTO FROM LIFE BY MR. RADCLYFFE DUGMORE. COURTESY OF DOUBLEDAY PAGE AND COMPANY.

Fig. 7. The animal to the left has the appearance of being as dead as dead can be, while its companion is taking a peep to ascertain whether its ruse is going to save him from his fate.

with its hand-like feet. While thus engaged, its little prehensile tail also came into use; it would curl the delicate end of it about a twig in a gingerly way—with evident infantile misgivings as to whether it could be relied upon in case its tiny feet became exhausted. During the daytime they were continually gaping, making the most ludicrous faces while doing so, and exciting to laughter all that beheld them.

At this age their marsupial pouches are quite rudimentary, but still perfectly evident, while the bushy extension of the hair at the root of the tail is distinctly seen. The hair of the body is long and coarse, being much shorter and finer upon the head, while it is sparse and extremely fine on the rather large, white ears. Long white hairs are produced from either side of the snout and from above either eye, the latter being round, large,

were not altogether as safe from interruptions as they thought themselves to be, when they first sallied forth to enjoy their sociable raid, for presently one of the farm-hands came walking down the pathway. "At this moment the 'possums made another mistake, for the man would probably have passed them unnoticed had they not snarled and thereby attracted his attention.

"Now it happened that the man was not an American, and in that accidental fact lay the 'possums' one chance for escape. An American farm-hand would have picked up a fence-rail and with it promptly ended the lives of the 'darn little varmints,' who, even though they were thieves, stole only that they might live. But the man was an Irishman, fresh from St. Patrick's Isle. He had never seen a 'possum, nor did he know anything of their peculiar ways. Only the week before he had

been engaged as a farm-hand, and had been left on the place while the farmer and his sons had gone to the polls to vote, for the day was election day—hence the quietness of the farm which had inveigled our two marsupials from their retreats.

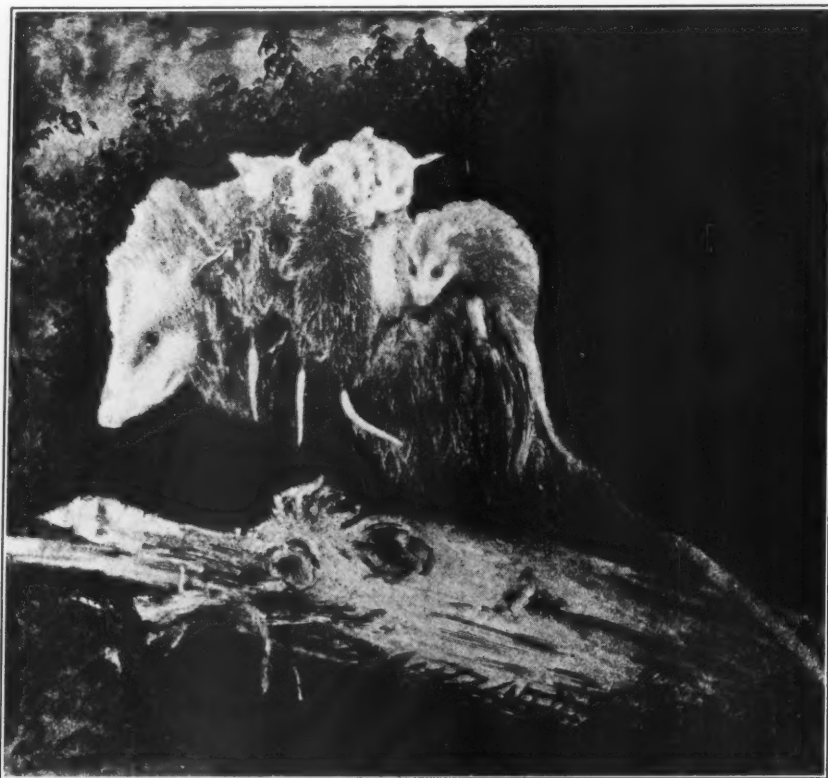
"Now when Dennis O'Connor saw the two strange beasts, his surprise was very great, and after uttering a few remarks that are best left out of print—for after all they have nothing to do with the story—he turned, brave man though he was, and made straight for the house. He remembered having noticed a gun standing against the wall near the chimney-corner. With such a weapon he feared no animal under the size of a dog, and he hurried out to do battle against the small silver-haired animals. These same animals had been making the most of their time. No sooner was Dennis out of their sight than they scurried along as fast as their short legs could carry them to the apple orchard. Once there, each proceeded to climb an apple tree. 'Possum One, in his hurry, selected a tree so small that it afforded him no hiding place, so he must perforce come down again,

and that he did in the quickest possible time, clinging to the tree with his naked, prehensile tail, as he partly slid, partly climbed down. Once on the ground, he made directly for the nearest tree, which chanced to be the one that 'Possum Two had chosen. Here was still another to add to the growing list of mistakes; and, like the proverbial drop that overflowed the equally proverbial bucket, it proved the undoing of their otherwise successful retreat.

"One 'possum might hide in an apple tree and remain undiscovered because of his color, which matches the silver-gray bark of the tree very closely; but two 'possums could scarcely hope to find places of concealment in the same tree. He heard the scratching sounds of

'Possum One as he climbed the tree. Nearer and nearer he came, until his nose was visible over the edge of the large knob. What might have happened is not known. 'Possum Two's vigorous protest against his friend's arrival was cut short by a loud report and a scattering of small pieces of bark where the shot had struck the tree just above the 'possums' heads. Scarcely had the echoes of the report died away, when Dennis saw two 'possums fall to the ground, and he congratulated himself on the 'foine shot' he had made, marching forthwith up to the seemingly dead animals. 'Shure but they're dead as nails,' he exclaimed, as he picked up one in a most gingerly way, quickly dropping it again. Yet there was

no blood visible; but in his excitement he had not noticed a detail so trivial. Enough for him that the two animals were dead, and he himself was responsible for their slaughter; and he turned to lay down the gun that he might light his pipe preparatory to carrying the animals to the house. As he stood still, trying to light his short clay pipe, his back was towards the 'possums. Everything was so quiet that 'Possum Two decided to have



AN OLD VIRGINIA OPOSSUM AND HER SIX YOUNG ONES. PHOTO FROM LIFE BY ERNEST HAROLD BAYNES

Fig. 8. Any one of these young ones is somewhat older than the specimen shown in Figure 2; it is not altogether an easy matter to pack them about—hence the expression of responsibility on their mother's face.

a look, and, without changing his position, he opened his small, dark eyes, closing them instantly when he discovered the broad back of his enemy between him and the sky.

"It was a close shave, for at that very moment Dennis, his pipe lighted, picked up the gun, and, catching hold of the two 'possums by their rat-like tails, took his way to the house. Once there, he threw the two 'dead' animals on the steps, and, leaving them, he turned and walked toward the gate, for he heard sounds of the farmer returning. Round a bend in the lane came a two-seated buckboard, mud-bespattered and rickety, and in it sat the farmer and his boys. Dennis O'Connor, all excitement and pride, rushed up to them and told the

family all about 'the two queer bastes Oi hev kilt,' adding quickly that he had killed 'thim both wid the one shot from the fowlin'-pace.' On being asked what he had done with his game, he pointed exultingly to the clean, bare steps, but—

"It was many months before Dennis could be persuaded to give up his belief that some one had stolen his 'possums. He never saw them again, and the story of 'playing 'possum' is, and always will be, a sore point with Dennis O'Connor."

During certain seasons of the year, opossums are often exposed in the market for sale; but the writer is inclined to believe that the majority of them are purchased by negroes, as they are very fond of them.

There are quite a large number of different species of opossums found in various parts of South America, and all have very interesting habits. One little species is no bigger than a mouse; has no pouch, and carries her tiny young on her back, with their little mouse-like, though prehensile tails twined about her own tail for support. A number of years ago, the writer heard of a bunch of bananas bought in the markets of Cincinnati; when its owner came to cut them off, a male of one of these diminutive opossums was found curled snugly in one of the open spaces separating the fruit near the main stalk inside. This specimen was later sent to the Cincinnati Zoological Gardens.

The fossil bones of opossums found in the bone caves of Brazil belonged to types of didelphian species, either identical with or closely allied to those forms now existing in the same country. The writer never speaks of fossil opossums that it does not bring to mind the anecdote of the great French savant Cuvier and his celebrated examination of one of them. The story is especially well calculated to illustrate the methods by means of which zoologists and palæontologists restore the skeletons of long extinct mammals from the discovery of a few bones belonging to any one of them. Many people—though fortunately not anything like as many as there were—claim that such restorations were purely a matter of guesswork on the part of the scientists, and that it was impossible to know what the skeleton or probable form of the animal was like, where not only it, but all of its kind, had been extinct for many thousand, or even for several millions of years.

But the story of the sagacious Cuvier shed considerable light upon cases of this character. He had on one occasion received a split slab of stone from the celebrated quarries of Montmartre, in France. In these two halves were contained the fossil bones of the best part of a skeleton of some small mammal or other, of which, however, only the lower jaw and some of the teeth were exposed. These Cuvier closely examined, and came to the conclusion that the animal was a fossil opossum, closely related to existing species of that group. He further announced that when the workmen in the laboratory came to clear the skeleton of the matrix of stone in which it was encased, they would find that the animal possessed the marsupial bones of all the opossums. This part of his prophecy was subsequently fully con-

firmed; although when he made it, the aforesaid marsupial bones were completely out of view and sealed up in the solid rock containing them. Mr. Huxley, in his *Science and Culture and other Essays*, gave us some admirable deductions drawn from this very case that any one may read with profit, especially one who delights, not only in the triumphs of science, but in a brief lecture upon the methods employed in scientific reasoning.

During all the early history of this country, zoologists recognized but one species of opossum as belonging to its fauna, this being the well known Common or American Opossum. It was first described by Linnæus in 1759, and it was fully forty or more years after this before any other species of United States opossums were described.

FORESTRY IN GREAT BRITAIN

THE Earl of Selborne accepted the vice-presidency of the Royal English Arboricultural Society, Major G. L. Courthope announced, when presiding at the quarterly meeting of the council of the society, held at 16 Bedford Square, London. Proceeding, Major Courthope said he thought that on the whole the society might feel satisfied with the personnel of the forest authority. He was glad to say that the spirit which the members of the authority were displaying was very friendly to the society and to private enterprise in general. He hoped that this feeling would be continued, and that the results would be good. He understood that the authority was prepared almost immediately to make an announcement as to the various forms of assistance to private enterprise which it was prepared, with the approval of the treasury, to give.

Mr. Leslie Wood said he thought the various bodies interested might send a scheme for the government to criticize rather than wait for the government to get one out, cut and dried. The subject had been discussed by the forestry committee of the Land Agents Society, and he had prepared such a scheme which, he thought, might be brought to the notice of the English Forestry Association and the Surveyors Institution.

Mr. Duchesne announced that the British Empire Timber Exhibition would be held in London in 1920. It was being promoted by the overseas department of the Board of Trade, and would probably be held early in July, at the Holland Park Skating Rink. The object was to encourage the use of timber grown within the empire rather than supplies from the Baltic or other countries.

The president said he thought an effort should be made on behalf of the home-grown timber trade to see that it was well represented at the Empire Timber Exhibition, at least as well represented as India, Canada, Australia, and other dominions.

THE annual meeting of the National Wholesale Lumber Dealers' Association will be held at Washington, D. C., on the 24th and 25th of March. Headquarters will be at the New Willard Hotel, and the sessions promise to be of unusual interest.



THE WEASEL CLUNG AROUND THE GREAT BIRD'S NECK, TEARING AT HIS
SHOULDER WITH BLOOD-STAINED TEETH

MAMMY COTTONTAIL AND TROUBLE

BY ALLEN CHAFFEE

AUTHOR OF

I. "THE ADVENTURES OF TWINKLY EYES," THE LITTLE BLACK BEAR

(WITH ILLUSTRATION BY PETER DA RU)

II. A FIGHT WITH THE HORNED OWL

MAMMY Cottontail, the little brown hare, watched breathlessly while the weasel ran along the interlacing branches, soundless as a shadow. The weasel's slender body ended in a tiny wedge-like face with ears laid back flat and eyes gleaming red with murder.

Mammy crouched trembling behind a tree-trunk, her round eyes all but starting from their sockets. For even as the weasel glided snake-like along the limb, he peered this way and that through the gathering twilight.—But the weasel was after the gray squirrel, who now faced him from his hole with teeth bared in an angry "Chir-r-r" sounding his warning.

The weasel, with a hiss, snapped his teeth into the squirrel's nose, while the squirrel, fighting for his life, clamped his long front teeth through the weasel's jaw. But the weasel was the larger, stronger animal.—What followed turned Mammy's heart sick within her.

The victor in the unequal contest did not even have the excuse of being hungry. He had killed merely for the love of sport. And the gray squirrel once stretched limp on the ground beneath, he left it lying untasted.—That kind of killing was new to Mammy Cottontail's experience. She knew that in a race with a weasel she would stand even less chance of escape than had the gray squirrel. Then her blood froze with the awfulest fear she had yet known!—The weasel had found her trail!

Yes, sir, Mammy's blood froze! She was too stiff to move! Though it was useless to run as to fight. But even as she crouched there, like a brown clod on the white snow, an amazing thing happened.

It was by now quite dark, and the stars were pricking through the curtain of the sky. From away up in the top of a scraggly fir tree, at this instant, came a long, weird cry.

"Wa-hoo! Wa-hoo! Whoo! Whoo! Whoo!"

It was Whoo Whoo, the great horned owl, his feathers now white like the snow. (For he was protectively colored, changing his coat from Bark-brown to white and back again every year). Mammy had one more foe to fear! Then—the owl swooped toward the weasel!

Yes, sir! Mammy Cottontail saw with amazement that one enemy was to be played off against the other. The great white owl was swooping straight toward the weasel, yellow claws bared for a grip in that writhing back, and beak clicking angrily at memory of some time when the snake-like one had killed the baby owls.

A fierce old warrior was Whoo Whoo, the horned owl. His body was as long as the weasel's and a great deal heavier. On silent wings the great bird dropped to the back of the white-furred little murderer, who was by now sniffing at Mammy's trail. Then the weasel turned to face his ancient enemy, with teeth bared in a hiss, all the fury of his recent hurt blazing in his eyes, his wounded jaw dripping red on the white of his chest.

There was a whirl of white,—ghost-like in the gray gloom,—then a wild mingling of clacks and hisses, and a great pair of silent wings rose till they hung above the tree tops. Their owner clung with beak and claws to a writhing, wriggling snake-like body in white fur. But the weasel also clung around the great bird's neck, tearing at his shoulder with blood-stained teeth, and clawing at the feathery sides with his four sharp sets of toe-nails.

Mammy did not wait to see how the struggle ended, though as Jimmy Crow told her next day, the Horned Owl won, reaching at last to the weasel's heart with his great steel claws, and finally devouring him for supper, with much discarding of the white fur in pellets that he spat out on the ground below.

(Whenever you find little balls of fur lying under an old hollow tree, you may know that Whoo Whoo or one of his cousins lived up there. For they swallow their mice nearly whole. Then their stomachs roll the fur up into a marble ready to cast it forth the way it entered).

No, Mammy Cottontail did not wait to see which one of her foes got the worst of it. But the instant she saw her chance, she made off up-stream as fast as ever she could go, till she found a place where the river was frozen a little harder. And once more she crossed on the thin ice, and made for her home in the Old Apple Orchard. And for several weeks thereafter she was quite content with nibbling anything she could find, bark and twigs and frozen grasses, without going more than a few jumps from home.

Then one night,—a mild one for that time of year, she caught a wonderful odor. It was the odor of cabbage that was being thrown out to the chickens at the Valley Farm. And so long had she fared on tasteless bark that she made up her mind to have a leaf of that cabbage. She knew it was a rash resolve, for there was Lop Ear, the Hound, and Tom, the Barn Cat, and the Hired Man who carried a gun. But the wind was blowing that luscious odor straight to her now, and she simply could not resist.

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BIRD VISITORS FROM THE NORTHLAND

BY A. BROOKER KLUGH

WHEN the days grow short, the nights long, and chilly winds sway the leafless branches most of our familiar birds forsake southern Canada and the northern States. But the land is not birdless by any means. Some species, such as our blythe little friend the chickadee, the nuthatches, and the woodpeckers, remain throughout the winter, and many avian visitors come down from the northland.

There is a charm about the study of these winter visitors—the charm of uncertainty, for they are very irregular in their movements. Some species are usually



AMERICAN CROSSBILL

common and remain with us for a considerable time, but may, in any winter be rare or present only for a brief period. Other species again may be common during one winter and then absent from that locality for several years.

They are rovers, one and all, rovers which descend from their homes in the north in search of food. For it is food they seek and not a milder climate. There is no danger of a bird freezing as long as it has sufficient fuel with which to keep the fires of life burning brightly. A bird is clad in the warmest and lightest of all clothing, in clothing, moreover, which can be regulated as to its warmth at will. The best non-conductor of heat is a dead-air space, and a bird can, by fluffing out its feathers, increase the number of dead-air spaces between its body and the outside air. Hence the "fat" appearance of birds in cold weather and their slimmer appearance in warm weather.

One of the most regular and commonest of our winter visitors is the snowflake. This species is about seven inches in length, and in winter plumage is largely white with light brown on the back and top of head and black

central tail-feathers. It breeds on the arctic tundra and in the breeding season the males are entirely black and white and the females black and white with some brownish on the back. The snowflakes usually appear in large flocks and as they fly overhead they utter a musical trilling note. When the flock drops to earth the birds run about among the weed-stems which project above the snow and feed on the weed-seeds. Their favorite seeds are those of rag-weed and pig-weed, though the seeds of many other weeds are also eaten, and by thus destroying the seeds of noxious weeds the snowflake renders a decided service to the farmer.

Another bird which often appears in large flocks, though not with the regularity of the snowflake, is the redpoll, a species about five and a half inches in length, with a patch of red on the crown. While in flight the redpolls utter a chattering call interspersed with long-drawn "sque-e-e" notes. The redpolls feed in the open fields after the manner of the snowflakes. The summer



EVENING GROSBEAK

home of this species is in Labrador and round Hudson Bay, where it builds a compact nest of fine rootlets and grass, lined with feathers, and placed about two feet from the ground in a dwarf willow. In its winter migration the redpoll sometimes goes as far south as Virginia, Alabama, Kansas and Colorado.

The pine siskin is a little bird about five inches in length, flaxen-colored, and heavily streaked with dark brown above, and whitish, streaked with dark brown beneath. It is sometimes termed the "winter canary" on account of its similarity in notes, size and behavior to the American goldfinch or wild canary. This bird breeds in Labrador, Nova Scotia, New Brunswick, eastern Quebec and in the Rocky Mountain and Coast Range. It also occasionally breeds further south. The

pine siskin is a bird of the woods and feeds on seeds of such trees as the birch and alder. It is very irregular in its visits, sometimes occurring in immense flocks and again during some winters being entirely absent. When it visits a locality it usually remains much later than most of our winter birds, often into May and sometimes early June, and at these times the males break into a very musical little song.

Everyone knows the chipping sparrow, the familiar little chestnut-crowned bird of the dooryard and the vines. But in the winter chippy has departed for a sojourn in the Gulf States or Mexico, and in his stead we have his cousin the tree sparrow, which is a little larger than chippy and has a blackish spot in the middle of its breast. The summer home of the tree sparrow is in Labrador and in the region west of Hudson Bay. The tree sparrow is often abundant in shrubbery at the borders of fields, and feeds almost entirely on weed-seed. During the winter the tree sparrow utters a musical callnote and in the spring, just before the flocks leave for the north the males may be heard pouring forth a loud, clear and powerful song.

A bird which attracts attention whenever it appears is the pine grosbeak. In this species the adult male is red with brown wings and tail, and two white bars on the wings. The female is smoky gray with the top of the head and the rump tinged with orange, and the young male is also smoky gray with reddish on the head and rump. The bill is short and heavy—hence the name grosbeak. The adult male is not infrequently mistaken by superficial observers for a robin, and often reports of the very early arrival of "robins" are thus circulated in the press.

The pine grosbeak usually appears in small flocks consisting of two or three adult males and a dozen or so females and young, but occasionally flocks of from fifty to over a hundred are seen. These flocks as a rule remain in a locality for several days, feeding on the berries of the mountain ash, and nightshade, and on the buds of the maple and spruce. In some winters this species may be common in a given locality from November until April, as soon as one flock passes on its place being taken by fresh arrivals from the north. On the other hand it is often absent for several years in succession.

The pine grosbeak breeds in northern New Brunswick, Labrador, in the territory round Hudson Bay, and westward to Alaska. The nest is placed in a coniferous tree and is built of twigs and fine grass, the eggs being pale blue, spotted with lavender, drab and sepia.

During the winter the pine grosbeak as a rule only utters its clear call note of three syllables, but when the flocks remain late in the spring the males may be heard singing a rich warbling song.

A much rarer visitor than the pine grosbeak is the evening grosbeak. This species has a very heavy bill and is needed "uncou' thick i' the neb" as the Scotchman

said of it. The adult male is a very striking bird, being greenish yellow with a blackish crown, black wings and tail, and a large white patch on the wing. The females and young are brownish gray above and dingy yellow beneath, and lack the large wing-patch.

The evening grosbeak breeds in the northern Canadian Rockies, and in its winter migrations it comes south and east as far as Ohio, New York, and the New England States. These flights vary greatly as to extent and the numbers present. In some winters, as in 1915-16, large flights occur and extend over a wide territory, then often for many years the birds are not seen.

This species in the winter feeds on the seeds of the Manitoba maple, the berries of the mountain ash, and various buds, and its powerful bill enables it to crack even such hard objects as the stones of cherries.

The evening grosbeak, coming from uninhabited regions, has but little fear of man, and many people who do not usually pay much attention to birds are struck by the tameness of this species.

Very peculiar birds in several respects are the American crossbill and the white-winged crossbill. The structure of the bill is unique, the mandibles crossing each other and thus forming a very efficient implement for removing the seeds from between the closed scales of the cones of evergreens. There is no definite rule as to the manner in which the mandibles cross, the lower mandible may be to the right or to the left of the upper mandible, it is entirely a matter of chance. A second peculiarity is the irregularity in their breeding season, which may be at the end of January or which may be delayed until as late as August, and a third peculiarity is that they may breed in a certain locality during one season and then may not nest there again for some years.

In the American crossbill the adult male is red with black wings and tail, while the female and young are olive-green with yellow rump and underparts. This species breeds in Maine, New Brunswick and Nova Scotia and westward to Alaska. It is erratic in its winter distribution, and sometimes goes as far south as Georgia and Louisiana.

The adult male of the white-winged crossbill is rose-pink with black wings and tail; the female and young are olive-green with yellower rump and abdomen. Males, females and young all have two white wing-bars. This species nests in Labrador, Newfoundland, northern New England, northern Michigan, and west to Alaska, and in its winter migrations goes as far south as Virginia, Illinois and Nevada.

Both species feed mainly on the seeds of coniferous trees and while feeding they keep up a cheerful twittering chorus.

Other winter visitors from the north are the snowy owl, the northern shrike, a gray bird about the size of a robin with a hooked bill, and the Bohemian waxwing, a cinnamon-brown bird with a crest and a white bar on the wing.

NEW ORLEANS CHILDREN BUILD BIRD HOUSES



Photograph by courtesy of the
New Orleans Item.

SOME OF THE SUCCESSFUL COMPETITORS

BLUE ribbons, as national recognition from the American Forestry Association for the best bird houses built in competition, were recently awarded New Orleans children by the "New Orleans Item." Even the girls, the Garcia sisters, shown in the upper right-hand corner, realizing that this is "a woman's age," contrived a neat looking structure. The top group shows M. L. Alexander, head of the state department of conservation, at the left, and Dr. William E. Scheppegrell, president of the Audubon Park Commission, at the right, carefully checking up points on the houses. The boy at the upper left, Howard Hamilton Tebault Harper, is the youngest bird house builder in New Orleans. He is five years old. His great great grandfather and the great great grandfather of Theodore Roosevelt were the same man. His grandmother, Mrs. C. Hamilton Tebault, is vice-president general of the National Society of the Daughters of the American Revolution.

PROTECTION OF BIRDS

BY JULIA FORCE

BIRDS, as a portion of the realm of natural history, have been so cruelly slaughtered and otherwise persecuted, that they are much less numerous now than a hundred years ago. Man, with little effort could and should assume a definite work of protection to lessen every form of destruction.

When heavy snows cover the ground and the seed supply for the time is unattainable, the birds should be fed. Grain scattered about farm buildings, crumb baskets, corn ears and bundles of grain hung in trees, will tide the suffering birds over such periods of strenuous weather. The same can be done for fatigued birds which meet with heavy rains and strong gales during migration. Upon reaching their destination, migrating birds are hungry, lean and exhausted; and without human assistance great numbers must die. This is especially true in northern latitudes if the birds meet a backward spring which retards insect growth. It is then the birds are most likely to come to the vicinity of houses. There they meet one of their worst enemies, the cat; and if they choose their nesting places near they must live in perpetual fear for their lives and that of their nestlings when hatched. Much destruction is worked by both stray or homeless cats and well-fed ones; and because there is a superstitious fear the killing of cats brings bad luck, birds are left to suffer from that source almost without exception. Another source of destruction has been the small boy with the gun. Without discrimination, he has gratified his hunting instinct and love of adventure. Nor has he limited his depredations to bird-shooting alone. Egg collecting and nest destroying attack him as a fever with the recurrence of spring. His acts of cruelty are most probably due to ignorance and thoughtlessness

but they do not manifest more of it than does the woman of fashion. One of the grossest forms of cruelty to birds springs from the caprices of fashion. That ladies' hats may be adorned with feathers, thousands of old birds are slaughtered during the breeding season, which means death by starvation to the helpless young. It is claimed that the majority of feathers used for millinery purposes are taken from birds in the tropical forests, but

it is a well-known fact that the feathers of our plainest songsters assume the brilliant colors of tropical plumage when passed through the dyeing pot. Water birds, especially along the shores of our country, are victims of greed. Egg hunters gather and place on the market for food, thousands of their eggs. That naturally diminishes the annual number of young hatched. We could soon end the practices of commercializing birds and their products as well as the small boys' hunting; and with slight individual effort preserve thousands of birds each year.

Ignoring their biological classification, birds are conveniently divided into two classes, beneficial and harmful. While no birds are wholly beneficial, neither are there any totally harmful. They are all, therefore, worthy of man's protection to the extent that no kind becomes extinct nor accumulates to the degree that they become pests. Good examples of the useful sort are quail, robins, orioles, woodpeckers and most sparrows because they help

keep insect life within supportable limits. Less beneficial birds are crows, blackbirds and English sparrows; so regarded because of their depredations upon grain wherever they find it. Hawks and owls are usually classed among harmful birds, because of their tendency to destroy poultry; but a study of their habits has proved



A ROBIN'S NEST ON THE GROUND

This robin chose to lay her eggs directly on the ground, under a small syringa bush in the garden, without even a little straw under them. Miss Alice Bingham, one of our members, sent in the picture because, she says, "I have never before seen a robin lay her eggs on the ground, nor has anyone to whom I have described the occurrence. The mother sat on the eggs devotedly but we saw no sign of the father, and at the end of a week the mother, too, disappeared. I'm afraid the neighbors cat, whom we had scared away several times, finally caught her. I believe the picture is sufficiently unusual to be of interest to other bird-lovers." And we agree with her.

that with a few exceptions, these birds prefer small animals of the fields, such as rabbits and mice. So prejudice against them is slowly being overcome.

However, the protection of birds insures a return of two-fold value to the protectors. If for no other reason, most birds should be protected for the beauty, music and companionship which they offer the world.

To the agriculturist, be he farmer, truckman or fruit grower, the practical value of birds should be sufficient reason for his protection. Birds are known to eat quantities of destructive insects such as chinch bugs and beetles, and the larvae of same. Birds are attracted to fields, pastures and orchards if they are fed and unmolested; and they very soon lose their timidity at the approach of humans. Many birds will make their homes in birdhouses provided for them by man. City dwellers are not exempt from assuming a share of the protection of birds, for the trees and shrubbery about their houses, along the streets and in the parks suffer from the ravages of insects quite as much as rural vegetation.

Efficient state laws as a means of protection, have been slow in coming. When the study of agriculture as a science was introduced in this country about forty years ago it gradually exposed the relationship that exists between it and birds. Their food habits were discovered and their great value realized. Game birds were protected in the early part of the nineteenth century; but small birds were not given a legal standing until later. Every state now has bird laws, but they are not uniform the country over. The prohibition of Sunday shooting, and the requirements of gun licenses in almost all the states, have done much toward eliminating the wholesale destruction of birds; but proper laws must be based upon and supported by the opinion of an enlightened public. Laws in many states forbidding the trapping of song-birds for pets, are leaving many more to enjoy their free state. Without doubt, more effective results can be secured through dissemination of knowledge concerning birds. People can always be found who are glad to hear and read interesting facts about birds. To give everyone the opportunity, able writers and lecturers can be called upon to contribute to the press and lecture platform information on the relation of birds to man. Perhaps the public school can get more far-reaching results, by using a short period each week in systematic study of the birds of their localities, in observance of Bird Day and in organizing bird clubs. Teachers can make their efforts felt outside the schools through the children, by distributing government publications on the subject and by posting bird laws. This general instruction will not only give information on birds that are favorites, but will remove much prejudice concerning some of the less favored. There should be no doubt in the minds of clear thinking people that protection of birds in general affords increased pleasure of living.

The beauty of plumage gives pleasure to the eye trained to artistic appreciation; beauty of song cheers the unhappy and creates added pleasure for the happy; and

birds in general furnish companionship for the lonely. For the farmer whose mind is necessarily concerned with crops and their financial returns, the protection of birds results in increased yield through the diminution of insect life. Increased yield means increased profits, and they in turn provide more efficient means for education, health and contentment, the combination of which spells happiness for the possessor.

THE OYSTER TREE

THE following good old story, published in the *Morning Courier and New York Enquirer for the County*, in its edition of November 20, 1829, has been sent in by Mr. Lott Van de Water, Jr., Secretary of the Agricultural Society of Mineola, L. I., N. Y.

"On a branch of the main river of Tomboz, in Peru, a singular appearance is presented by the oysters which line its banks. The reader has heard of that extraordinary tree in Numington, so large that a coach and horses can be driven with ease through its hollow trunk!—of that wide spreading oak of Nismes, said to cover an acre of ground!—as also of the far famed Upas, so baneful in its effects that instant death would attend the temerity of that traveller who should approach within five miles of it, and whose vicinage is covered with the dead bodies of the animals, reptiles, birds, and insects which have ventured within the sphere of its contagious influence! But has he ever heard of the oyster tree!—a tree on which oysters were the fruit?—Nay, start not gentle reader.—This branch of the main river that I have been speaking of is so lined with trees and underwood, as almost to exclude the rays of the sun. The branches of the trees, like the weeping willow, grow downward; at high water, the tide rising and falling six or seven feet every twelve hours, and overwhelming the low-lands, these branches become partly immersed. Thousands of oysters attached themselves to them, and at low tide they are seen suspended several feet above water, and present a curious spectacle. We plucked two boat loads of this species of marine fruit, which, though small, nearly equalled those of the Chesapeake."—*Voyage to South America in 1823.*

[A similar phenomenon may be witnessed on the Island of Jakel, situated in the mouth of the Alatamaha River in Georgia. The civil, or sour orange tree, abounds on the margin of the Island, the branches of which falling into the river, are acted upon in the same manner, as that of the tree above described; and what may be thought to add to the curiosity is, that the upright branches of the tree are frequently found abounding in their natural fruit, while those prostrate in the flood are supporting their marine adoption.]

INDIANA'S PRIZE WINNING FORESTRY ESSAYS

AS previously announced in *AMERICAN FORESTRY*, the 1920 contest for the best essay in forestry is on and will be open until May 15, 1920. A prize of five dollars has been offered by the State Division of Forestry for the best essay from the seventh and eighth grades, and a prize of \$7.50 for the best essay from each of the high school classes. Interest and competition is already warm among the students. Following are excerpts from some of the prize-winning essays for 1919.

comes from the birch forests of the Northwest. The walnut that is used for gunstocks is furnished by forest trees. Trench, dugouts and other embankments are often supported by timber from trees. Gas-masks are important features in modern warfare. It is interesting to know that the nuts used in making masks come largely from forests.

"An effective means of transportation is essential to national defense in case of war. Railroads furnish one



FOUR OF INDIANA'S FORESTRY ESSAY PRIZE WINNERS FOR 1919

Leland Williams, Jesse L. Baily, Alice Plane and Charles W. Hebbinghaus

The topic chosen was, "The Relation of Forests to National Defense," and Leland Williams, of Franklin, Indiana, writes, in part:

"There are three cardinal relations existing between forests and national defense. The fact that few people realize or recognize the importance of these relations, does not lessen that importance but only gives a reason for emphasizing it. The most important of these relations are those which exist between actual warfare and forests.

"The birch that is used in the manufacture of airplanes

means of transportation. Millions of cross-ties are used in a railroad system. Wooden ships also play an important part as does the wooden box car. Barrels and wharves are also used extensively. Timber, furnished by forests, is very useful and necessary in time of war.

"Another important relation is the one that exists between production and forests. Everyone knows that during war-time one of the great problems is to feed the army, navy and civilian population. In this emergency, forests again become of value as they help to conserve moisture by giving back through the leaves, in the

form of a vapor, what moisture would otherwise have been lost. Every foot of forest timber that is wasted weakens the vitality of the nation."

Alice Plane, of Evansville, submitted a very interesting paper, in which she says:

"Forestry is the science or art of forming, caring for and cultivating forests. A simple definition is forest management, again it is called conservative lumbering. Its object is to make the forest render its best service, yet to increase rather than to diminish its usefulness in the future.

"Forestry is a new science. Before the latter part of the eighteenth century there were few people who knew anything at all of this science and these people were either scholars or practical woodsmen. Although it is hard for us, today, to credit Germany with anything worth while, we must admit that it was she who gave this knowledge to the world. The science spread from Germany to France and thence to the rest of the world. With the exception of China, America has been the last to accept this doctrine and make it practical. We should all be vitally interested in this subject because it is a question which affects each one of us individually, and which affects the welfare and prosperity of the nation as a whole. Forests prevent the drying up of our streams; they protect the headwaters of streams for irrigation. The union of the many streams which have their origin in the forests of the Rockies form our mighty Mississippi River. Navigable rivers would help to obtain quick communication in time of war. A country which is well wooded has a larger rain-fall than that country which is not; and a country which has plenty of rain-fall produces more food than one which has little. Forests prevent the erosion of hillsides and so prevent the destruction of fertile farm lands. They also regulate our water supply that is used for irrigation, and everyone knows the part that irrigation has played in the barren west, to make that country more productive. Because of the condition of the European countries during the war, we know that plenty of food is essential for victory.

"There are three things which win war: men, money and food. Since the forests make better men and protect the people from natural dangers, since it is expected that in the future the national forests will be a source of income to the Government, and since they help in so many ways to make our country more productive, we are, by by taking care of our forests providing the three essentials of war."

The following is taken from the essay of Jesse S. Baily, another prize-winner:

"Wood plays a wonderful part in the life of a nation. It cannot live without it. It is said that Greece and Rome fell because they had no great forests. For many years before the great war, Germany bought all the walnut that she could get in America, but even so she did not have the wood she needed and failed. For years the European nations have known that wood was absolutely necessary for the defense of a nation and have planted great forests. The European nations have no

ground to waste. Europe is smaller than the United States but she has many times as many people. She has seen the need of having timber so has planted vast forests.

"The relation of forests to National Defense need hardly be mentioned. During the war something was heard from the Government on this subject. Spruce was needed for airplanes. Not common, ordinary spruce, but the finest, straight grained spruce only could be used. Black walnut was in demand for gunstocks. Boy scouts searched the country over for walnut trees and many were found. No satisfactory substitute has been found for wooden railroad ties and these form a large item in the expense of railroads.

"Wooden ships are used more extensively than any other, and the United States needs every ship it can get for use in foreign trade to make a market for our goods and thus stimulate our manufacturing and production of raw products. We do not always understand the advance in price of our favorite newspaper. It is because wood pulp cannot be gotten. Why is this? Because the timber has been wasted, there is less wood pulp and the manufacturers wish to save for future use. The United States might do as foreign governments have done—start forests, but plant such trees in the forests as will be beneficial for the defense of the country. Spruce and black walnut are two that it would be well to plant."

While Charles W. Hebbinghaus, of the Central High School of Evansville, writes:

"If we should go deeply into the question of what the essentials to the defense of our great country—and, in fact, any nation—we would find that one of the chief factors is forestry. For were it not for this great industry, no ships could sail upon the ocean, nor could any guns equip our soldiers.

"In the first place, the trees which grow in our many great forests, furnish the wood for the construction of the great ships which constitute our navy; or, in case of our modern iron-clad vessels, they furnish wood for the framework, furnishings, flooring and all the woodwork of our ships.

"In the second place, no army could carry on a war were the country devoid of forests. For it is of the strong, hard wood of our black walnut trees that the stocks of the guns which equip our fighting men are constructed. A third instance, last, but by no means least, is that the trees yield wood for the providing of shelter for our soldiers—that is, the dugouts of the trenches, in which our soldiers repose; and these are constructed almost solely of wood, and it is quite plain that no army which was utterly devoid of means of shelter could continue to exist very long.

"Therefore, from these three illustrations, it is quite evident that one of the chief essentials to national defense is forestry, since it yields such a useful product therefor, and for these reasons, it behooves every owner of large forests to obtain from them as high an amount of production as possible."

MEMORIAL TREES—OUR HEROES' HALL OF FAME

MEMORIAL tree planters are erecting their own Hall of Fame for their heroes. The "Hall" will be vaulted by that "inverted bowl we call the sky" and the memorial trees will be placed on "Roads of Remembrance," in memorial groves and as the proper setting for the various forms of memorials. The trees being planted now will be famous fifty years from now and even more famous in a hundred years. Communities throughout the land are planting trees and dedicating them.

The Dumont Kennedy Elm at Crawfordsville, Indiana, is one of the best examples of famous trees with a war association. *AMERICAN FORESTRY* pictured this tree last month. Mr. Kennedy is hearing from all over the United States about that tree as a result of entering it in the Hall of Fame. This tree stands on one of the most famous little streets in the country. There are five houses on the street—Lincoln Street, by the way—and from those five houses went nine boys to the war for humanity. Every one of these boys had played beneath the shade of that tree. They all volunteered when the Mexican trouble came up. They did the same when their country called to enter the world war. A monument was placed on the little street and Senator James E. Watson, of Indiana made a speech. The names of those boys who played beneath that tree are: Ora Jolley, Ray Jolley, Forrest Jolley, John Hilliard, Harry Hilliard, Howard Fisher, Louis Spilman, Harry D. Michael, Clyde Suitor. Is there another Lincoln Street? Are these trees on it? If not let us put trees on such streets and on all streets. This tree dedication is but an indication of what any community can do.

In Baltimore tree planting has been started on a fine scale. The *AMERICAN FORESTRY* has received an account of the tree planting there from Mrs. J. Barry Mahool. Other organizations may learn from this statement what can be done in tree planting. The account follows:

The "Grove of Remembrance" in Druid Hill Park was dedicated to the fallen heroes of the world war by the visiting delegates to the convention of "War Mothers of America." During the convention all visiting delegates affiliated into one organization, now known as the "Service Star Legion." The ceremony was deeply impressive as well as very beautiful, in fact, so impressive was the scene that Cardinal Gibbons, who had come only to pronounce the benediction, made a brief address, paying tribute not only to those who had made the Supreme Sacrifice, but to the motherhood of the land gathered at this shrine. At the head of the parade marched 1,000 school children each carrying an American flag, and singing patriotic songs. Behind them came twenty War Mothers, members of the Ohio delegation, carrying the flags of the Allies. These formed an escort of honor for the invited guests who followed on foot: Ambassador Jusserand accompanied by Mrs. J. Barry Mahool, Madame Jusserand with Colonel Wilcox, Gover-

nor Harrington, of Maryland, with Mrs. T. Parkin Scott, Mrs. Harrington with Judge Oscar Leser, and Mayor Broening, of Baltimore. Delegates carrying their state flags or banners followed. The following states were represented: Alabama, Arkansas, California, Kentucky, Massachusetts, Maryland, Montana, Mississippi, Ohio, Oklahoma, Indiana, Iowa, Illinois, New York, Nebraska, Utah, Pennsylvania and Washington State. Commander P. H. B. Weems had charge of the military division of the parade, composed of a detachment of G. A. R. veterans representing the Wilson and Dushane Posts of the Department of Maryland; Red Cross Workers, followed by soldiers, sailors and marines. At the end of the procession were automobiles with twenty wounded men from Fort McHenry.

The French Ambassador threw a spade full of earth upon the tree planted in memory of the dead of France. Governor Harrington followed for Maryland, Mayor Broening for Baltimore and the delegates for their states. At the Michigan tree Mrs. Mary B. Westnedge, of Kalamazoo, planted the tree not only for the slain of Michigan, but also for her own son, Colonel Westnedge, of the Twenty-Sixth Infantry.

In the Iowa delegation Mrs. Lew McHenry, a connection of the old Maryland family of McHenry, and Mrs. Murdo McRea, planted the state tree in memory of the brave sons of Iowa who had made the supreme sacrifice as well as for her own sons, Captain Harry McHenry, of the One Hundred and Sixty-Eighth Infantry, and Corporal Donald H. McRea, who were killed in a surprise attack of the Germans in the Lundville sector.

At the Massachusetts tree a Gold Star sister, Miss Evelyn Harpell, threw on the spade full of earth on the tree in memory of Massachusetts dead and her own brother, Sergeant Carroll D. Harpell, of the One Hundred and Third Machine Gun Battalion.

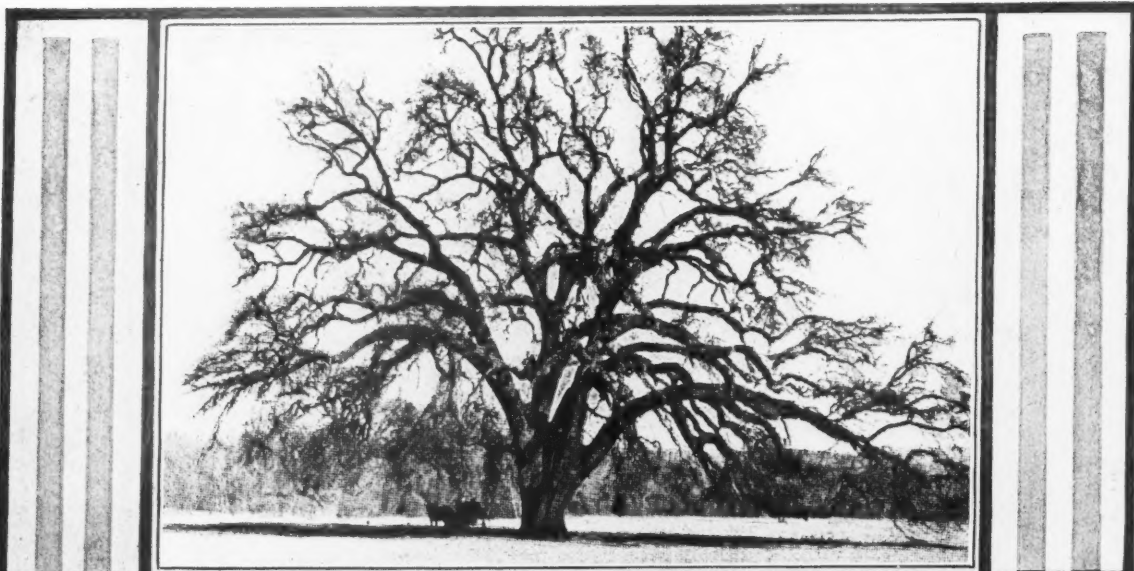
At the Ohio tree stood Mrs. D. McPherson wearing a Gold Star for her only son, John D. McPherson, Company C, Signal Corps, Forty-First Division.

At the West Virginia tree stood Mrs. Eugene Cordell and Mrs. J. M. Gribble. Mrs. Cordell wearing a Gold Star for her son, Sergeant Littleton Tazewell Cordell, Twenty-Ninth Division, One Hundred and Tenth Machine Gun Battalion.

With four sons in the war, Mrs. J. E. Linscott, of St. Petersburg, Florida, planted the tree for her state. One of these four boys, William Milton Hance, of the Twelfth Machine Gun Battalion, of the First Division, lost his life in the Argonne sector.

Mrs. A. W. Funkhouse, of Indiana, cast the first spade full of earth on the tree for her state. She wears two Gold Stars for two sons, Lieutenant Albert Craig Funkhouse, Company H, One Hundred and Forty-Fourth Infantry, Thirty-Sixth Division, and Second Lieutenant Paul Taylor Funkhouse, Company B, Seventh Machine

"HALL OF FAME" FOR TREES



Above—The Sir Joseph Hooker Oak, at Chico, California, which has been entered in the Hall of Fame of the American Forestry Association at Washington by C. C. Royce. Is there a famous tree in your town? This oak, according to Gen. W. T. Sherman, would shade 7,000 men at noon. Six feet above ground the tree's circumference is 28 feet 4 inches. The height is 110 feet. The longest limb is 102 feet. The tree is in a park deeded to Chico by the widow of Gen. John Bidwell.

Below—Standing in the Friends Cemetery at Salem, New Jersey, this oak is nominated for the Hall of Fame for Trees being compiled by the American Forestry Association by Cora June Sheppard, of Shiloh, New Jersey. Under this tree in Revolutionary days soldiers of Washington's Continental Army were drilled. The tree has a spread of 111 feet. Surveyors say its branches cover almost a quarter of an acre. The highest branch is 88 feet from the ground and its circumference two feet above the ground is twenty feet. The tree is known to be 300 years old.

"HALL OF FAME" FOR TREES



Above—The largest Live Oak in the South, a veteran in 1763, has been nominated for a place in the Hall of Fame for Trees being compiled by the American Forestry Association at Washington. The Association wants reports on all trees with a history or of unusual size for its "Who's Who." A. D. Dart, of Oriental, North Carolina, who makes this nomination, says it was called "Lovers's Oak" by the Indians. The tree is in a public park at Brunswick, Georgia, and a foot above the ground the circumference is 28 feet. This photograph was taken with the sun directly overhead and the shadow measured 90 feet in diameter.

Below—The most famous tree in Indiana is at Corydon. It is the Constitutional Elm, and it has been nominated for a place in the Hall of Fame of the American Forestry Association at Washington, which is hunting for the trees of America with a history. On June 10, 1816, members of the Constitutional Convention met beneath this tree, which is on the banks of Big Indian Creek, and a few hundred feet from the first State House. The tree has a spread of 124 feet, according to C. C. Deam, State Forester.

Gun Battalion, Third Division. At this tree Mrs. W. E. Gymer also participated in the ceremony in memory of her son, Lieutenant Alfred K. Gymer, Three Hundred and Fifteenth Infantry, Eighty-Fourth Division.

At the Pennsylvania tree there were eight Gold Star mothers who threw earth upon the tree planted for Pennsylvania heroes who included their own sons—Charles P. Holoran, James Austen, Wm. John Miller and Robert A. Miller, Alfred Peter Stumpf, Edward McL. Wise and Raymond Horne.

At the Maryland tree, surrounded by flowers brought from the Green Spring Valley in memory of the boys of the Valley, stood Governor Harrington, who threw on the spade full of earth in memory of Maryland's brave sons. With him was Mrs. A. F. Fraley whose son, Lieutenant Earl Fraley, of the Three Hundred and Thirtieth Infantry, had made the great sacrifice.

At the tree planted in honor of Baltimore's own were Mayor William F. Broening, Mr. and Mrs. J. Barry Mahool, the latter wearing a Gold Star for their son, Captain George Frame Mahool, of the Forty-Fifth Artillery; Mr. and Mrs. August Ritter, whose son, Christian Ritter, Jr., of the One Hundred and Fourth Ammunition Supply Train, Twenty-Ninth Division, was one of those who did not come back; Mrs. Anna Barrett, mother of Joseph Barrett, killed in the Navy Yard, Philadelphia; Mrs. E. J. Croker whose son was lost at sea; Mrs. P. J. McLernon, mother of John McLernon; Mrs. K. Golden Kennelly, mother of John Golden Kennelly, killed in France the day the armistice was signed; Mrs. George W. Thompson, mother of George Potter Thompson, Company C, One Hundred and Fifteenth Infantry, killed in the Argonne; Mrs. Ella Hart, mother of Edwin Sommerfield Hart, also of the One Hundred and Fifteenth; Mrs. Elizabeth S. Tillman, mother of Frank R. Tillman,

Thirty-Third Artillery; Mrs. John H. Butler, mother of Lieutenant Edward E. Butler, of the U. S. Air Service, killed at Issoudun, France; Mrs. Richard Lynch, mother of Vernon Lynch, killed at Government Experiment Station in Washington.

The musical program was under the direction of Mr. Frederick R. Huber, director of the Baltimore Symphony. The service was concluded by the rendition "A Golden Star," by Sousa, in memory of Quentin Roosevelt, and dedicated to Mrs. Roosevelt. Mrs. Robert Carlton Morris made the dedicatory address.

A grove of trees similar to this, but much smaller, was planted in Patterson Park, Baltimore, Md., as a memorial to the Baltimore boys from East Baltimore, who lost their lives in the war. This was under the auspices of Mrs. George W. Hughes, 253 Ellwood Avenue. On November 16 a tree was planted by the congregation of Baldwin Memorial Methodist Episcopal Church, Severn Cross Roads, Anne Arundel County, in honor of eight members of the church who participated in the war. The tree was presented by Mrs. Robert A. Welsh, president of the Anne Arundel Chapter of the D. A. R.

There is inspiration in every line of this account of memorial tree planting. The Service Star Legion plans even more extensive planting the coming spring. At York, Pennsylvania, the Women's Club in conjunction with the Chamber of Commerce has taken over a big program for planting the Lincoln Highway. A wonderful legacy is to be left to the coming generation. Will you have a part in this legacy by taking the lead in your community? All this work needs is leaders in each town. What finer memorial than to have it said, "He planted trees."

NATIONAL HONOR ROLL, MEMORIAL TREES

Trees have been planted for the following and registered with the American Forestry Association, which desires to register each Memorial Tree planted in the United States. A certificate of registration will be sent to each person, corporation, club or community reporting the planting of a Memorial Tree to the Association.

BRIDGEPORT, CONN.

By Crain Company, of Bridgeport: Sgt. Ronald M. Peck, James J. Mulligan, Martin A. Anderson, Howard Olmstead, Albert Waller, Thomas P. Healey, Ingacac Baltuaraitis.

COLLEGE PARK, GA.

By Presbyterian Church: Douglas Connally Lyle.

MILLEDGEVILLE, GA.

By Mrs. L. J. Anderson: Lt. John Wilcox Anderson.

LOGANSPOUT, IND.

Civic Class of High School: 359 Students of School who answered Country's Call, Lt. Joseph Wilson, Frederick Banta, John Parker, Harry Grohs.

HOBART, IND.

By Miss Elizabeth Maybaum: Harold Maybaum.

INDIANAPOLIS, IND.

By Service Star Legion: Theodore Roosevelt.

INDIANAPOLIS, IND.

By Indianapolis Orphan Asylum: Theodore Roosevelt, William Warner, Curtis Simmons.

INDIANAPOLIS, IND.

By Ben Davis Chapter, American War Mothers: Corporal Clark Moore.

FRANKFORT, KY.

By Bridgeport Graded and High School: Heroes of World War.

LOUISVILLE, KY.

By Second Ward School: Sgt. York, General Pershing, General Hale, President Wilson, Gen. John B. Castleman, Ernest Kettig. By Nicholas Finzer School: Lawrence Smith. By J. Stoddard Johnston School: Raymond Lurding, Robert Prince, Clarence Philips, Robert Smith, Soldiers who died in recent war. By Albert S. Brandeis School: Dr. Samuel Brandeis, Mrs. Caroline Brandeis, Albert S. Brandeis, Richard C. Brandeis.

BOROUGH OF MIDDLESEX, N. J.

By Watchung School: Holmes Marshall, Russell Hall, Benjamin H. Giles, John H. Down, Benjamin Efinger.

ELMIRA, N. J.

By Elmira Rotary Club: Lt. Harry B. Bentley.

METUCHEN, N. J.

By Chamber of Commerce: Edward C. Fugel, Harry Hansen, George R. C. Smith, Archie Hummer.

LUMBER BRIDGE, N. C.

Mrs. J. W. Hall: Joseph L. Shaw.

ADDYSTON, OHIO

Sgt. Cecil Rowe, Benjamin Steelman, George Hayhurst, James Hennessy.

HATBORO, PA.

By Home Defense: Frank G. Girard. By "The Neighbors" Woman's Club: Alvah Chandler Williams, Frederick Edward Gensel.

MEMPHIS, TENN.

By Mrs. E. S. Conser: Frank S. Latham, Jr.

APPLETON, WIS.

By Appleton High School: William Heiss, Harvey Pierre, Cylus Bogan, Elmer Witthuhn, Irving Roth, Clarence O'Connor.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

HE Annual Conference on Fire Protection, under the auspices of the Quebec Forest Protective Association will be held in the Windsor Hotel, Montreal, on the 28th of January. The special topic to be discussed will be railway fires—that is, the number of fires set by railroads and the best course to be pursued in eliminating this hazard. The reports of the St. Maurice Forest Protective Association for the past season show 60 per cent of the fires to have been set by railroads, most of them by the Canadian Government-owned lines, and practically all the fires were set by a few defective engines which scattered sparks day after day. There is absolutely no excuse for such conditions and drastic action must be taken.

An effort will be made to make this meeting a little different from the usual routine. There will be only one paper read and the meeting will then be thrown open for general discussion on a list of topics to be issued with the programs so that everyone can come prepared. Speeches will be limited to five minutes.

On the 29th the Meeting of the Woodlands Association of the Pulp and Paper Association will be held and the program will be the same as that of the Conference, only one paper and then general discussion along the lines of the following topics: airplane mapping and timber reconnaissance; slash disposal with reports on the experiments carried out by the Laurentide, Bathurst and Abitibi Companies; the use of tractors in woods operations; pulpwood scaling and the possible further elimination of waste in logging. These meetings will be thoroughly practical and it is hoped that many American lumbermen, paper men and foresters will join us.

The writer has just made a trip to Florida, and from Washington south to southern Florida the engines were setting fire to the woods so that the evil is not confined to Florida. Along the line of the Atlantic Coast Line ground fires were burning almost everywhere and often young timber was being entirely killed.

Perhaps the Canadian National Railways may eventually find it cheaper to fix their engines than to pay damages. Leave is being asked of the Crown to sue the Railways Department in two cases for \$143,000 and \$185,000, respectively, and two other suits will probably be brought.

There will be a large convention of the Canadian Forestry Association held in Toronto sometime in February to discuss the situation in Ontario. The new Minister is making a thorough investigation of the whole question and much progress is hoped for. Better fire protection is needed and the entire elimination of political patronage. The placing of the administration of the forest lands of the Province under the Forestry Branch is also urgently needed.

This same situation is also to be met in the Dominion Forest lands and the Hon. Arthur Meighen is turning his attention to this situation and making a study of the situation. He is a man of vision and is planning great improvements in the administration of the water powers and forest reserves and it is to be hoped that he will consult men who understand the situation and are not tainted by party politics. He is also looking into the subject of making maps of the great unsurveyed areas in the West by aerial photography and some experiments may be tried out during the coming summer.

In 1918 the Union Government of South Africa voted fifty thousand pounds sterling for reforestation, which will be undertaken at once. In the last normal year, 1913, the imports amounted to 17,500,000 million cubic feet, 90 per cent of which was coniferous, worth one million two hundred fifty thousand pounds sterling; and the Chief Conservator of Forests estimates that even if all the possible forest resources are ever developed they are never likely to be able to provide more than five per cent of the country's requirements. Assuming, on a very conservative estimate, that an acre of plantation will yield 100 cubic feet of timber per annum, it will take 350,000 acres to produce the probable requirements of the country in fifty years time. At present there are only 70,000 acres of Government plantations in the Union, and of these 20,000 acres are for special purposes, as, for instance, 7,000 acres in the Transkei to provide hut wattles for the natives. The above shows the need for prompt action. The work at present is being confined chiefly to mountain land which is of little value for any other purpose, but the question of accessibility for easy distribution has not been overlooked.

Plantations have been started which will total 92,275 acres, of which 3,933 acres will be planted yearly and the total cost

will be £49,125. The different works will take from five to fifty years to complete at an average cost per acre of slightly less than £13.

An interesting comparison is drawn between the revenue from the indigenous forests and from the plantations. That from the latter is nearly double that from the former, and more than double if the railway plantation returns are taken into account. The yield of timber and firewood from the planted forests is also much greater than from the natural forests. From the Western Conservancy, a planted area 800,000 cubic feet worth £11,000 was cut during the year; whereas, from the Midland Conservancy, the most heavily forested of the natural areas in the Union, the yield was only 394,000 cubic feet worth £6,000.

As the world's consumption of timber is increasing while the forested areas are decreasing, it is of national importance for South Africa to supply a large part of its own timber requirements and make itself as independent as possible of foreign supplies.

The Journal of the Spanish Forestry Association, *Los Amigos del Arbol*, gives some extracts from AMERICAN FORESTRY and pays it some nice compliments.

The Spanish River Pulp and Paper Company at Sault Ste. Marie, Ontario, has started a night school with a good attendance.

The New Brunswick Forest Service will commence experimental planting next spring with a ten acre tract. This has been clean cut and will probably be planted with spruce.

The white spruce failed to seed all through eastern Canada last year and there is practically no seed to be had. The crop of Norway spruce in Scandinavia was very poor last season and the supply will be short and prices high next year.

The Forestry School of the University of Toronto is asking prominent foresters and lumbermen to address their students on the qualities which go to make a good forester. This should be helpful to the students, if the men who speak really know to what their own success is due.

The Research Department of the Laurentide Company is experimenting with the cooking of jack pine with the sulphite process.

EDITORS URGING PERMANENT

THE Christmas Tree cover of the AMERICAN FORESTRY attracted a great deal of attention from the editors of the country. Dr. Frank Crane, who writes for a syndicate of newspapers, reproduced it as a Christmas feature. The Association has received many letters in regard to permanent Christmas trees which the Association advocates as a means of keeping alive the ideals of Community Service and the community spirit the year around. The Association has urged that wherever possible a community transplant a tree that will stand the year round as a center of all community effort as well as the center of the Christmas exercises.

Profiteers in Christmas trees had a great surprise when people refused to pay from \$4 to \$10 each for them. The Associated Press dispatches to the *Washington Star*, say:

Pittsburgh, Pa.—Pittsburgh produce men are seeking ways and means to dispose of some 40,000 Christmas trees left unsold on the market without destroying them. Fifty carloads of trees remain in the produce yards awaiting disposition. Eighteen carloads were taken to a dump yesterday and thrown away.

New York.—Speculators in Christmas Trees in New York were hard hit this year, and dealers who had hoped for big profits have hired truck men to cart many remaining firs to the bay. Others were turned over to janitors to help heat apartments.

The American Forestry Association has no quarrel with intelligent Christmas tree cutting but when profiteering enters into holiday things it seems time to call a halt. Our view is well expressed by the editor of the *Buffalo Evening News*, who writes:

"Many American cities have adopted the Community Christmas tree as an annual institution. But so far it has always been a dead tree, set up temporarily, to be removed as so much rubbish.

"Now comes the American Forestry Association with the suggestion that the tree be a living one. Such a tree would be all the more attractive because of its permanence. It would take on character in keeping with its use.

"Children and grown-ups who love Christmas would love that tree. It would be a source of pleasure and enjoyment all the year round."

In the opinion of the editor of the *Cleveland Plain Dealer*, "the Christmas tree is too praiseworthy an institution to

be abolished unless the need is too plain to be questioned. There is, as yet, no reason for abandoning the use of Christmas trees, but there is abundant reason for preaching discretion and common sense in the harvesting of the trees.

"The Christmas trees, mostly spruce, with some pines, firs and hemlocks, have in the past been gathered indiscriminately. Any small tree that has caught the fancy of the axman has been ruthlessly cut. The value of the trees thus destroyed reaches millions of dollars each year."

The matter is one of grave concern to the *Christian Science Monitor* whose editor writes: "One thing worth noting about the present holiday season in the United States is that its celebration, compared with prev-

deemed essential in a half-million homes, not figuring the thousands of shop windows that must have them to meet the requirements of the season. That would mean 500,000 young trees removed from the forests of Texas, new growth which, if permitted to stand, would within a generation take the place of their elders and make less difficult the work of reforestation that is going to be necessitated.

"The green that is needed to give a festive touch to the home decorations can be obtained, and should be, without destroying baby trees. This isn't a kill-joy suggestion. It is practical. And at its heart lies the seed of self-protection."

Why not perpetuate a happy Christmas with a growing tree is the question asked

by the editor of the *Detroit Free Press*, who points to what a sad thing a stripped and dead Christmas tree is. He writes: "The Christmas tree, denuded of its gifts and decorations, is a sorry sight in the backyard after its brief period of pleasure-giving is over. One can but feel regretful at the fate of a thing once so full of life and promise. The artificial Christmas Tree is a poor substitute for the real thing. It has been suggested that instead of the tree life thus terminated, we should call for evergreens that have been lifted, roots and all, set in a pail or tub with earth enough to make them solid, use them as desired and then set them aside to be planted out in the spring,

thus performing the double service of Christmas tree and ornamenting the premises afterward, instead of becoming unsightly rubbish that must be carted away. The plan sounds feasible and though involving an increased expense, makes a certain return for the investment if the tree is replanted.

"Some hundreds of acres are cut over annually through selection of the finest and best-shaped conifers for shipment at the holiday season. In view of our diminishing forests and of the number of trees provided which remain unsold, the present wasteful methods ought to be reformed."

That the growing of Christmas trees should be an industry and serve a double purpose is the view of the editor of the *Youngstown Telegram*, who tells of the plans in Ohio in the following editorial:

"THE HALL OF FAME"

The Boston Herald's editor gives a generous half column to the Hall of Fame For Trees of the American Forestry Association, saying in part: "The American Forestry Association believes that the time has passed for regarding the tree merely as building material, as a source of paper or as so much potential firewood. It is gathering photographs of the most remarkable trees in the United States for a 'Hall of Fame.' How many of us realize the aptness of the lead thus followed? Folklore students and ethnologists show that there was a period in human history when our ancestors worshipped trees and regarded them as the progenitors of the race. In our own land the association has a vast continent in which to make selections. Well indeed has the oldest living thing on earth justified its title to a place in the 'Hall of Fame for Trees.'"

ious years, apparently brings somewhat less harm to the forests. Year by year, the cutting of evergreen trees has seriously affected the value and beauty of the wooded area, until, at last, the thought of tens of thousands of trees annually destroyed had become a matter of grave concern. Now it has been realized that the waste is needless, that the forest may actually be improved by removing practically worthless trees, and that these trees can be built up, by boring holes in the trunk and inserting additional branches, until they answer yuletide purposes quite as well as any that might have been selected."

There are few more valuable suggestions in the mind of the editor of the *Dallas Evening Journal*, who speaks of the toll each year and then adds: "Roughly estimated, there are a near million homes in Texas. Say that a Christmas tree is

CHRISTMAS TREES FOR COMMUNITIES

"Growing Christmas trees is the latest industry suggestion for Ohio. The forestry department of the state experiment station at Wooster, believes it would be a profitable industry, and there is no doubt that it would be since only ground that is otherwise valueless need be used.

"Yet there are thousands of acres of almost barren land in Ohio admirably suited for the growth of spruce, and 'Christmas' and not pine as so many believe. The evergreen is a slow-grower but the forestry department says 2,500 Norway spruce can be grown to a size suitable for Christmas decorations on an acre of ground in four to six years, and will bring perhaps 60 cents each. Netting that return on poor ground is worth while, and in addition really valuable trees now cut down merely for temporary decorations would be saved."

Keener and keener becomes the drive for a national forest policy on the part of the editors. The print paper situation has brought them to a halt in many places. In the view of the editor of the *Ithaca Journal* the situation is this: "The American For-

estry Association is trying to have the government adopt continuous policy of preservation of the forests, something going far beyond the effort now being made to protect them from destruction by fires. Reforestation is the special policy upon which continuation of forests for future generations chiefly depends, accompanied by more stringent regulation of the cutting of timber for the protection of the small trees and younger growth. Planting seeds is a slow process, especially in the burned-over areas. It must be done on a large scale to be effective."

"Shortage of print paper," says the *Illinois State Journal*, "and discussion of the problem which it involves has created a healthy revival of the forest conservation movement. Demand for a policy embracing something more substantial than the parking of vast tracts of the public domain and policing the forests against fire is taking form."

"How many Americans are aware that the American forests are disappearing

rapidly?" asks the editor of the *Jacksonville Times-Union*. "Yet the warning comes from many authoritative sources. Charles Lathrop Pack, president of the American Forestry Association, says the United States has only about one-fourth of its original forest and this is now disappearing very much faster than it is being reproduced. 'The United States must decide upon a national forest policy in order to perpetuate its timber supply,' he declares. 'We have no adequate forest policy now. We are far behind France, Great Britain, Germany, Japan and other nations in this respect.'

"Protection against fire, proper thinning out when it is needed, and replanting are three of the main requisites in forest culture. Fire is the chief enemy of the forest, as the almost yearly accounts of extensive fires which occasionally rage in the great forests of the still heavily wooded Northwest shows. Thinning out produces more merchantable timber and replanting as trees are removed for timber or for firewood perpetuates the forest. All of these are factors in an intelligent forest policy.

HERE'S THE HISTORY OF JOHNNY APPLESEED

DURING the first decade of the nineteenth century, when Ohio was still a vast wilderness, save for a few river and lake towns, a queer looking man came down the Ohio in a canoe, towing another, and both were loaded with sacks of apple seeds, according to High Spots in Ohio's History in the *Columbus Citizen*. The work of the American Forestry Association of Washington, D. C., in campaigning for memorial tree planting and the planting of fruit or nut bearing trees wherever possible, particularly in the gardens of the country, makes the life story of "Johnny Appleseed" interesting at this time.

The man was John Chapman, known in Ohio history as "Johnny Appleseed," who did more for encouraging the growing of apples within the Buckeye State than any man who has come after him.

Johnny went ashore in what is now Jefferson County and at a spot nine miles below Steubenville he planted his first orchard. This was in 1806. He had brought the seed from cider mills up in Pennsylvania.

For more than 30 years following this, Johnny Appleseed was a noted character in the wilds of Ohio. Every pioneer family knew and loved him and every latch-string was open to him.

People in those days called Johnny "queer," but even so, he had a wide

influence on their lives. He was educated, refined and polite and everywhere he went throughout the state he carried a Bible and a few books with him and of evenings, as he enjoyed the hospitality of some log cabin he would lie before the fire and read to the family and expound religion.

Johnny's idea was to set out orchards in various parts of the state so that there would be young trees ready for the new settler to plant on his land when he arrived in Ohio. In the course of a year Johnny would travel hundreds of miles going from one orchard to another, pruning and taking care of the young trees that he had planted.

Although the forests abounded with hundreds of savage Indians who were continually murdering the whites, none of them ever bothered Johnny. They regarded him as a wizard and the fact that he never carried a gun convinced the Red Men that he was under the special guidance of the Great Spirit.

An early Ohio historian describes Johnny as follows:

"His nature was a deeply religious one and his life was blameless among his fellowmen. He regarded comfort more than style and thought it wrong to spend money for clothing to make a fine appearance. He usually wore a broad-brimmed hat. He went barefooted not only in the summer,

but often in cold weather, and a coffee sack, with neck and armholes cut in it, was worn as a coat.

"Upon his journeys Johnny usually camped out. He never killed anything, even for food. He carried a kit of cooking utensils with him, among which was a mush pan, which he sometimes wore as a hat."

During the War of 1812, when the British and the Indians were terrorizing the population of Ohio, Johnny often warned the people of approaching danger.

Once, the Indians killed a man in Richland County and the residents of Mansfield fled to the blockhouse which was the town's public square. It was believed a general massacre was about to be attempted by the savages and it was imperative that help be secured from troops that were then at Mt. Vernon. But who would go? The Indians were lurking on every side and it was thought to be certain death for any messenger who might attempt the trip.

Johnny Appleseed, barefooted, bareheaded, volunteered to go. That night he disappeared into the woods and between Mansfield and Mt. Vernon he visited many settlers' cabins and warned them of the danger. When he returned to Mansfield it was with enough help to overawe the Indians and prevent the attack.

In his late years Johnny left Ohio and went to Fort Wayne, Indiana, to live with a relative. There he died in 1847.

The Southern Pine Association

maintains a department of Cut-Over Land Utilization, which, with the U. S. Department of Agriculture and other agencies, is seeking to determine the best uses which can be made of the cut-over lands in the Southern States. The logical division for the utilization of these many millions of idle acres are—

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SOUTHERN PINE ASSOCIATION

NEW ORLEANS, LOUISIANA

DR. SCHENCK WRITES FROM GERMANY

GORDON DORRANCE, of the Maryland State Forestry Department, has received an interesting letter from Dr. C. A. Schenck, former head of the Biltmore Forest School at Asheville, North Carolina, who is now in Hesse-Darmstadt, Germany. Dr. Schenck, after fifteen years teaching forestry in the United States, returned to Germany shortly before the war. He was badly wounded while serving on the Russian front, later saw service in Belgium and was retired from active service in 1916.

Dr. Schenck says:

"As regards forestry in Germany, there is little to be said about it. Prices for forest products are intolerable; building impossible; while the foresters continue to consider forests as their own. We could, without a doubt, obtain more of a livelihood from them than we are doing, though bread is more badly needed than is wood. Meantime, there is but little over-cutting. Fortunately, I dare say, for if the forests are a nation's savings-box, the time has surely come for Germany to empty it.

"Graves" (the present chief forester's) schemes for a wider application of American forestry have interested me greatly. I think your national forest reserves will flourish, more than I ever expected. What became of Pinchot? I long for American papers—and can get none here.

NATIONAL FOREST HIGHWAYS

THE Secretary of Agriculture has approved the construction of the Grand Canyon highway on the Kaibab National Forest with a maximum expenditure of federal funds of \$50,000, provided co-operation could be secured from the county to the extent of construction within the forest and maintenance of the road between Kanab and the forest boundary. In Nevada he has approved the construction of the Currant Creek road with a maximum expenditure of federal funds of \$25,000 and the Austin-Eureka road with a maximum expenditure of federal funds of \$18,000, provided 50 per cent co-operation is secured. In Utah he has approved the construction of the Kane County section of the Cedar-Long Valley road with a maximum expenditure of \$35,000 and the construction of the Salina-Emery road with a maximum expenditure of federal funds of \$65,000 and the construction of the Panguitch-Tropic road with a maximum expenditure of federal funds of \$30,000, provided 50 per cent co-operation could be secured on all the Utah projects. In Wyoming he approved the expenditure of an additional \$50,000 on the Hoback Canyon road provided that at least an additional \$20,000 could be secured in co-operation.

SEEKING TURPENTINE IN THE WEST

The longleaf pine forests of the South are becoming so rapidly depleted by heavy cuttings of timber and destructive methods of turpentine that many turpentine operators who have depended on this species for naval stores are now turning their attention to the West as a possible source of such stores when their present stands of timber are no longer productive. It is quite possible that a method of turpentine similar to that carried on in the Florida National Forest, under the supervision of the Forest Service, can readily be used in the West. According to this practice the largest flow possible without injury to the trees is obtained by following a number of slashings with several seasons of rest. The cutting is done in such a way as not to impair the timber value of the trees. The promising results obtained by the Forest Service in applying these conservation methods to long-leaf pine in Florida led it, as early as 1911, to investigate the extent to which western yellow pine, so abundant in the United States, could be utilized in meeting possible future needs. Tests show that these trees can be turpentine successfully and that a satisfactory product can be obtained.



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STATE NEWS

CALIFORNIA

ADDED protection to California's fish and game is assured by a cooperative agreement just executed by Game Commissioner Carl Westerfield, of the Fish and Game Commission of California, and District Forester P. G. Redington, representing the Federal Forest Service. "Wild life on the National Forests in California is a resource which, besides being of great economic value, adds materially to the enjoyment of the Forests by the people of the State," says Commissioner Westerfield in commenting on the agreement. "Since the Forest Service is entrusted with the management of the National Forests, on which both fish and game are plentiful, and since the protection and perpetuation of that fish and game is a duty delegated to the Fish and Game Commission by the State, I consider the cooperative agreement a most happy one."

Continuous airplane fire patrol of the Angeles National Forest between May 1 and October 31, with a minimum of two planes in daily operation, is urged by the Southern California Section of the Sierra Club in a resolution recently forwarded to Chief Forester H. S. Graves at Washington.

The loss by forest fires of thousands of acres of timber and brush within Los Angeles County, a loss which is inestimable when the vast watershed is considered, might well have been averted if complete and modern methods of patrol were installed, according to Sierra Club officials.

More than 11,000 acres of timber land in the vicinity of Mount Shasta and Lake Tahoe belonging to the Southern Pacific Company was swept by forest fires during the past summer, according to a report issued by the Forest Service.

"It is true that this figure is less than one per cent of the one and one-quarter million acres of Company land which the Forest Service is protecting under cooperative agreement," said District Forester Redington in commenting on the report, "but this does not mean that the fires—and there were over 200 of them—did no damage. The contrary is true, for besides killing mature timber and marring for years some of California's most popular vacation grounds, they destroyed the greater part of the young growth on more than 11,000 acres of purely timber land."

With the public in California becoming more and more interested in forestry problems the California State Board of Forestry has outlined a plan seeking to direct awakening public interest along lines that will bring the quickest and best results.

The plan definitely adopted is in line

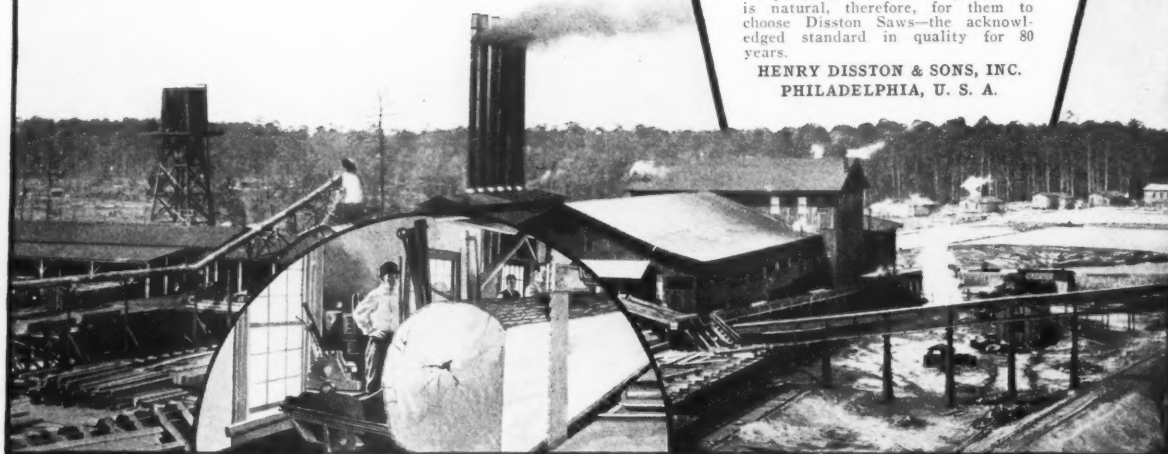
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with the policy outlined by Colonel Henry S. Graves. Three definite and necessary steps are proposed:

1. Appropriation of sufficient funds for the prevention and suppression of fires.
2. The acquirement by purchase of watersheds immediately necessary for the conservation of water for domestic and irrigation purposes.
3. The acquirement by purchase of logged-off areas, both in the redwoods and pine forests, as a nucleus of state forests to supply timber for future needs.

The amount of money to be asked for has not been definitely decided. It is believed, however, that at least \$150,000 will be necessary to install a fire protection and suppression system. It is still a question whether the other two propositions will be financed by direct appropriation or by bond issue.

The California State Board of Forestry is also cooperating with the United States Forest Service in urging upon the War Department the wisdom of Colonel H. H. Arnold's recommendations concerning airplane patrol of the Forests of the Northwest. Colonel Arnold's recommendations are the result of airplane patrol of the forests of California and Oregon during 1919.

More than half of the standing merchantable timber of the United States will, if Colonel Arnold's recommendations are approved, be placed under the watchful eyes

of airmen. Eighty million acres of these forests are government owned and represent eighty per cent of the government owned forests in the United States not including those in Alaska. It has been pointed out that the War Department now has the equipment and men and must keep its personnel in training.

Airplane patrols in California and Oregon during 1919 demonstrated to a great degree the value of the airplane in discovering incipient forest fires, in remote districts. Besides watching over millions of acres of government owned forests the birdmen at the same time see millions of acres of private and state lands and aid in protecting the lives and homes of settlers. It is proposed to use five squadrons of 18 airplanes each in patrolling the forests of California, Oregon, Washington, Montana, Idaho and Western Wyoming during 1920.

ILLINOIS

H. B. MILLER, State Forester, read a paper before the State Horticulturists meeting at Bloomington, Illinois, on December 17, on the "Forestry Situation in Illinois." In February he will be on the program of the Farmer's Institute, at Carbondale, Illinois, the subject relating to farm woodlands.

Considerable stimulation was given to the cutting of cordwood in Illinois during

the recent coal strike and many of the smaller towns fell back on the local supply of wood, thus saving coal for the cities. During this time press bulletins were sent out to the papers urging the use of wood for fuel. On the Cook County Forest Preserves, near Chicago, according to Mr. Kennicott, forester, from fifteen to twenty cords of wood were cut daily, this being from dead trees or trees killed by lighting.

There will be several good opportunities for reaching farmers at the University of Illinois during January and February to arouse interest in farm woodlands. Among the meetings will be the Farmers' and Stockmen's Convention at the University of Illinois, and a meeting of all the country advisers in the State scheduled for some time in February. An effort will be made to make special farm woodland exhibits, these being secured from the Forest Service, for both of these events, as well as distributing bulletins relating to farm forestry.

IN 1872, the late Joseph Field who lives nine miles northwest of White Hall, and owned a large tract of land along the main highway between White Hall and Patterson began the planting of soft maples along both sides of this highway through his farm, a distance of a little more than two miles, and the planting was completed in the following year," writes R. B. Pearce to American Forestry. "The trees were

set fifty feet apart, and formed what in after years became familiarly known in local history as Field's Lane. The trees were cultivated and given the tenderest care by Mr. Field, and they had developed an unbroken line of beautiful shade when in 1883 he died. Following the death of the founder of Field's Lane, the trees attained a size that caused those less devoted to trees to doubt the wisdom of maintaining a long line of shade that was sapping the land for a considerable distance along either side of the line. The north end of the Fields farm passed into the hands of the Sherwin estate, and for a distance of probably half a mile that much of the monument to Joseph Field, Sr., became extinct. Along the west side of the remaining portion the land is at this day in the hands of Capt. Field, a nephew of Joseph Field, Sr., and he declares that so long as he has charge there will not be a tree removed from Field's Lane. Along the east line the situation differs only in a degree. This land is owned by another descendant, Mrs. A. L. Brennerman, of Barrow, Greene County, who just at present is residing at Minneapolis. Mr. Brennerman figured that the sapping of the land along their line of Field's Lane extended inward so far that the crop loss, if it be saved, would be sufficient to pay the taxes on the

entire tract. In order to bring this about Mr. Brennerman conceived the idea of thinning out the trees along his land on the east side, and this is being done. When this work was started admirers of Field's Lane became apprehensive lest the grand drive is to become a thing of the past, but Mr. Brennerman gives reassurance that such is not the case by disclosing his plan of leaving every sixth tree. This, he holds, will maintain the beauty of the drive and at the same time restore the loss to the land on account of the great size that the maples have attained.

"Until another generation at least comes into possession of the adjoining land, the main structure of Greene County's most picturesque drive will be maintained as a monument to Joseph Field, Sr., founder of Field's Lane and the most devoted tree lover of his day."

NEW JERSEY

NEW JERSEY has taken active steps for the installation of three new forest fire lookout stations by next spring. They have been made possible through private co-operation to the extent of almost \$4,200 which has released a state appropriation of \$3,000, contingent upon securing at least an equal amount from private sources.

Two of the new lookouts will be in North

Jersey and one in South Jersey. There is also a possibility that the same funds will provide two other additional lookouts. These, with the three now in operation, two in North Jersey and one in South Jersey, promise a material start toward a statewide protective system of this nature, sorely needed for effective progress in forest fire control.

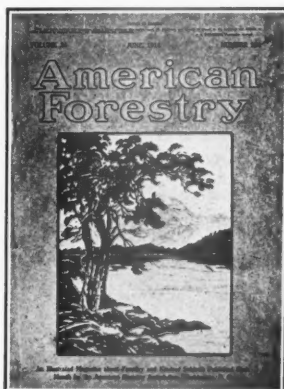
In connection with the proposed Kittatinny Forest Park a complete reconnaissance was recently made of two large tracts of forest land adjoining the Stokes State Forest. These lands may be secured for a very low figure, and would go far toward completing the continuous forest park along Kittatinny Ridge, from the Delaware Water Gap to the New York State line, which is advocated by the Department of Conservation and Development.

The present state forest at that point is most popular as a summer recreation ground, and more land is needed to accommodate the increasing number of campers. The spot is ideal for that purpose, with beautiful mountain scenery, trout streams, many small ponds, and two large lakes nearby, and convenient transportation facilities to all parts of the state.

The land is unsuited for agricultural development, but as a forestry proposition, it is of unquestioned value.

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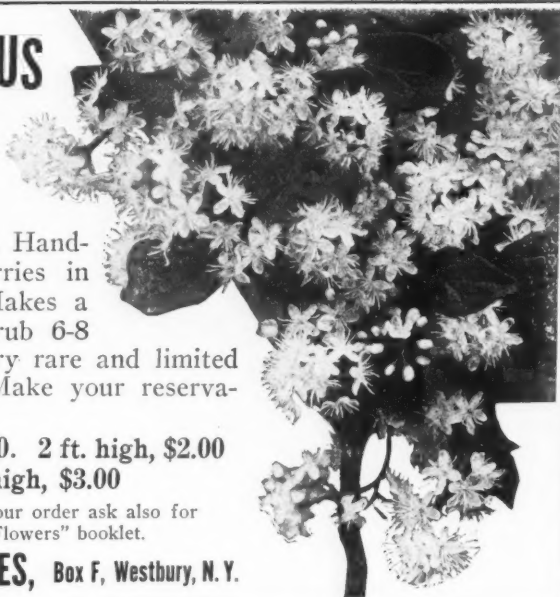
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AUSTRALIA STARTS QUARANTINE AGAINST TIMBER BORERS

PACKING boxes showing the workings of insect timber borers will not be allowed to enter Australian ports if the Federal Director of Quarantine at Melbourne can prevent it. He has called the attention of the American Consul to the fact that officers dealing with food substances and general cargo imported into Australia from the United States find that the packing cases not infrequently are constructed of wood showing the borings or workings of insect timber borers. That destructive wood-boring insects may not be introduced into Australia, the attention of the United States Government and shippers has been called to the matter and it is deemed important that some action be taken to prevent the packing and shipping of goods intended for Australia in wooden cases presenting evidence that wood boring insects are or have been present.

THE TOWN OF YELLOWSTONE

An executive order eliminating approximately 340 acres from the Madison National Forest, on the boundary of the forest which lies close to the western confines of the Yellowstone National Park, was signed by the President December 5. The object of this elimination is to provide space for the establishment of the town of Yellowstone under the town-site laws. Of the total area of 340 acres, 1.03 acres are retained by metes and bounds within the town limits for use by forest officers.

PIGEONS FOR FOREST FIRE FIGHTING

THE carrier pigeons and equipment of the Navy Department will be available for the Department of Agriculture next season for conveying messages from forest fire fighters "at the front" to headquarters, says a recent communication from the Department of Agriculture. The test of the birds for this use was carried out on a limited scale this season but it encouraged the Forest Service officials to believe that they can be employed profitably on a larger scale. To establish a successful carrier pigeon system, it will be necessary to lay plans during the coming winter, to have the posts properly located and get the birds acclimated and begin their training. Flights of 600 miles in a single day have been made, while a distance of 150 to 200 miles means a two or three-hour flight for the average bird. The distance which would be covered in Forest Service work are considerably less than this, in most instances the flights from fire fighting areas to headquarters being less than fifty miles. The value of the birds in mountainous regions where travel is difficult, would be especially great.

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WOOD AND FOREST—By William Noyes.....	3.00
THE ESSENTIALS OF AMERICAN TIMBER LAW—By J. P. Kinney.....	2.50
HANDBOOK OF CLEARING AND GRUBBING, METHODS AND COST—By Halbert P. Gillette.....	2.50
FRENCH FORESTS AND FORESTRY—By Theodore S. Woolsey, Jr.....	5.35
MANUAL OF POISONOUS PLANTS—By L. H. Pammel.....	5.00
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THE FOREST RANGER AND OTHER VERSE—By John Guthrie.....	3.10
TIMBER, ITS STRENGTH, SEASONING AND GRADING—By H. S. Betts.....	

* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

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I need a copy of *Forestry and Irrigation* for March, 1901. Will anyone who can furnish a copy please write me promptly? I should also like to hear from anyone who can supply copies of *The Forester*, bound or unbound, before December, 1900. I have quite a number of duplicates of *Forestry and Irrigation*, *Conservation and American Forestry*, the oldest being December, 1902, and should like to get in touch with anyone wishing to complete their files.

GORDON PARKER, Colorado Springs, Colo.

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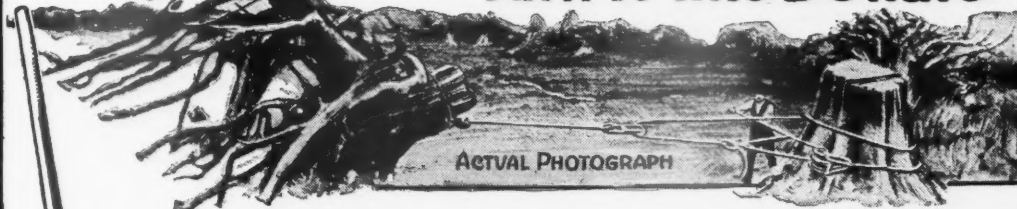
BOOK REVIEWS

Forests, Woods and Trees—In Relation to Hygiene, by Augustine Henry, Professor of Forestry, Royal College of Science, Dublin. An effort is made in this book to interest the statesman, the student of economics, the engineer, the physician and the layman, as well as the forester, in certain aspects of forests and trees, about which vague notions are prevalent. An endeavour is made in the first two chapters to recognize and describe the far-reaching influences of forests and trees on climate, flow of water, erosion of the soil, shelter from wind, purity of air and water, etc. Such influences affect directly the health and comfort of man. The value of forest districts as sites for sanatoria and the history and utility of parks, open spaces, and trees in towns are then discussed. The afforestation of the desolate pit mounds in the Black Country and other districts is shown to be a movement of great interest, especially when, as in some cases, it is taken up by school children.

One effect of the war has to bring home to thinking people the extreme importance of afforestation. The concluding chapters of the book are, with great fitness for the times, devoted to a study of the afforestation of the extensive gathering grounds, from which so many of the great centres of population obtain their supplies of water. No pains have been spared in obtaining statistics and information as to the physical features, ownership, and extent of these gathering grounds. The work of planting suitable portions of these areas with the aid of disbanded soldiers might be undertaken at once, without any disturbance to other industries. Their afforestation in any case should be linked up with the general scheme of afforestation of the waste lands of Great Britain and Ireland, which it is confidently expected will be undertaken by the State as soon as peace is made. Scattered as the gathering grounds are throughout the country, they will form convenient centres for planting, more especially in the cases where their ownership has been acquired by local authorities. The compulsory purchase of catchment areas, which are not already owned by municipalities, is advisable for sanitary reasons; and the necessary legislation may possibly be introduced when afforestation by the State becomes a reality.

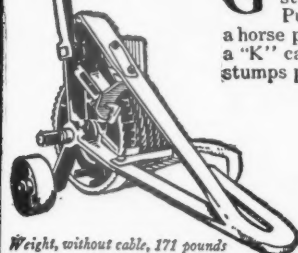
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FOREST SCHOOL NOTES

NEW YORK STATE COLLEGE OF FORESTRY

THE growing demand for foresters not only in America, but in all parts of the world, has been shown by the engaging of Carrol V. Sweet, a graduate of The New York State College of Forestry at Syracuse, for a three year contract in India, for special work involving his special training in dry kiln engineering begun here and continued as a specialist under the federal service at the Forest Products Laboratory at Madison, Wisconsin. Information reached Syracuse that Mr. Sweet will receive a salary of upward of \$7,200 a year and expenses for himself and family in the Orient.

Sweet graduated from The New York State College of Forestry in 1917, after taking special work in dry kiln engineering in addition to his required forestry subjects, and after the war went to the government service. The demand for specialists in dry kiln work is shown by the fact that Sweet probably receives nearly three times the salary from his Indian employers that the government was paying him as a forester.

The securing of Sweet for dry kiln work is of particular interest as it comes just as the College of Forestry is announcing a short course beginning March 1 in this particular subject, together with other short courses in timber grading, pulp and paper making, and forestry for boy scout executives and camp directors.

MICHIGAN AGRICULTURAL COLLEGE

EDITORS for this year's M. A. C. Forester have been elected as follows: O. A. Alderman, editor in chief; W. F. Jones and C. F. Martin associate editors. This will be the fifth consecutive year that the forestry club has published this book. Last year's edition appeared in June in spite of the small classes caused by the war and was an evidence of the enthusiasm and hard work of the members of the club. Material is being gotten together for this year's annual and it promises to be a very interesting book.

The forestry club held its annual campfire in the fall. The custom was broken by the war for one year, but this fall's campfire equalled any of the earlier one in interest. A large number of students attended. I. V. Anderson acted as toastmaster, and an enjoyable evening was passed listening to talks, singing and eating.

A number of changes are contemplated in the forestry course at the Michigan Agricultural College this year. The work in lumbering, forest utilization, mensuration, and valuation will be increased and a rearrangement of certain courses made placing the mensuration work earlier in the course and regrouping the courses. This is being done in order to make the technical work more intensive and at the same time to leave a considerable amount of latitude of electives.

YALE SCHOOL OF FORESTRY

IN many respects the present year can be considered one of the most successful in the history of the school. The war reduced the annual enrollment to a minimum of seventeen for 1917-1918. Three members of the faculty have been employed for the whole or a part of the war period in public service. With the opening of the present year the members of the faculty engaged in government work returned, and the number of students increased to the normal pre-war basis, the total enrollment to December of this year being thirty-six men, of whom fourteen are now members of the senior class and candidates for the degree of Master of Forestry to be granted June next. The present student body is drawn not only from many states in the Union, but from a number of foreign countries as well. At present four Chinese, three Norwegians, two Brazilians, one Englishman, and one Canadian or a total of eleven foreigners are enrolled. A number of these men are on scholarships granted by their own governments.

A recent compilation of statistics of the Yale School of Forestry shows that 514 students have been enrolled in the regular course and 229 in the short course, a total of 743 who have received instruction. The degree of Master Forester has been granted to 376.

During the past year the Yale School of Forestry received through a gift a tract of approximately 1,500 acres of mixed hardwoods, some 35 miles from New Haven. A lumbering operation having for its object the salvage of the dead chestnut was



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Moscow, Idaho

begun soon after the property was received. This operation will net the school about \$2,000.

The Keene Forest of more than 1,000 acres, was given to the school several years ago. It is composed chiefly of young stands of white pine. Considerable progress has been made within the year in increasing the holdings near Keene and in selling of detached lots some distance from the city. 60,000 white and red pine seedlings were planted in the spring. The book value of forest property now owned by the school, together with endowment and maintenance of the same exceeds \$72,000.

A recent compilation of alumni statistics shows that exactly fifty graduates of this school are on the faculties of twenty-four universities and colleges, where they are engaged in teaching forestry, and of this number fifteen are deans or directors of schools or are the heads of departments of forestry.

Mr. William Stuart Moir, of the class of 1917, is engaged in a year's study of forestry in Sweden on a fellowship of the American-Scandinavian Foundation. There are only two of these fellowships open to foresters, and there were many applications for them. Mr. Moir was the first choice of the committee which met in Boston early in June, 1919.

The Hubert C. Williams Memorial Fund has been established by Mrs. Claire K. Williams, of Lakeville, Connecticut, in honor of her son, Hubert Coffing Williams, of the class of 1908. Lieutenant Williams died of wounds received while leading his men of the 30th Engineers in the St. Mihiel drive in September, 1918. He left an insurance fund of \$10,000 which will be paid in installments over a period of twenty years. This has been turned over to Yale University as a loan fund for needy and deserving students in the School of Forestry.

PRESERVING POLES AND POSTS

TIMBER suitable for telegraph and telephone poles, fence posts, etc., is becoming scarce and expensive. It is estimated by the Forest Service that sixty years hence will witness the practical extinction of such material. At present about four million poles are being erected annually. Records show that 95 per cent of all poles are destroyed by decay, four per cent by insects and the remaining one per cent by mechanical abrasion.

Scientists who have been giving the subject attention advise, as a result of experiments conducted by them, that creosote treatment applied to the ends of the poles and posts imbedded in the ground will lengthen the life of white cedar poles 14 years; of cypress, nine years; of chestnut, four years; of pine, 13 years; of juniper, 10 years.

There are three methods of treatment adaptable to the purpose: The open tank method whereby only the butts of the poles are treated; the pressure process, used only on short poles, and the brush method which may be applied in the field as the poles are being set. The employment of the open tank method calls for the application of the treatment before the poles are shipped on the job.

As creosote and the labor required to apply it are much cheaper than new timber, it is needless to say that railroad companies, telegraph and telephone companies, farmers and all others using large quantities of timber for poles and posts are giving this matter much serious consideration. Even yet, however, entirely too many posts are being set untreated and unprotected. This is a form of business extravagance that is unwarranted.

THE AIRPLANE IN FIGHTING FOREST FIRES

AIRPLANES will go anywhere over any mountains not higher than 16,500 feet and will travel fourteen hours easily without landing, according to Colonel Hartz, addressed the annual convention of the U. S. Air Service, who recently Western Forestry and Conservation Association at Portland, on locating fires from airplanes, coming from Washington, D. C., in a huge Martin bombing plane.

An observer can see the forest fires from a distance, he says, and by radio he can communicate the location. His idea is that the plane remain directly over the fire until the fire-fighters arrive. It is possible to fight fires from a plane with a gas that was used by the Germans that removes the oxygen from the air. Landing places would have to be provided but this could be done even in the mountain country as the landings need not be smooth, merely on ground from which the stumps have been removed. Colonel Hartz described the method of taking mosaic maps as they are called, by a camera, of the country beneath, from the plane and he concludes that planes are a perfectly sane and safe method of traveling.

PENCIL STOCK

IN Tennessee the pencil companies are said to be replacing old fences with new woven-wire fences in order to secure the cedar rails. An investigation of woods not already used for pencils is being made by a lumber company in California, whose representatives have been in Washington and Oregon for the purpose. The juniper, the Alaska Yellow cedar, Port Orford cedar and Idaho cedar are being studied for both suitability and commercial supply. This company operates both in California and in the Tennessee red cedar district.

BOUQUETS

"The FORESTRY magazine is splendid and the work of the Association still more splendid."

DOROTHY B. BURROWS.

"AMERICAN FORESTRY is a very delightful magazine and I enjoy reading it monthly. You are certainly to be congratulated both on the appearance and subject matter."

F. A. BARTLETT,
President, Bartlett Tree Company.

"During the past year I have found your magazine more than useful in connection with my work with the Boy Scouts of America. I think that the type of nature work that you have been printing is most interesting and not later than last Sunday I was able to show to my scouts the different trails made by the animals described in your last issue."

SERENO STETSON.

"Please allow me, as an individual, private citizen, to express my sincere admiration and high appreciation of the very valuable and important work you are promoting in the development of AMERICAN FORESTRY. I am a great lover of trees and believe you will long be remembered for the great work you are doing."

J. H. VAIL,
Rochester, N. Y.

"I wish to compliment you, yes, congratulate you on the excellence of your magazine and to be identified with your organization as a member is a privilege I prize very highly indeed. . . . Right here I wish to compliment you very highly on the excellence of the illustrated articles in recent numbers."

A. F. BLOOMER,
Pasadena, Cal.

"I think the pictures of the spring wild flowers in AMERICAN FORESTRY are the most superb that I have ever seen. I am delighted with the magazine."

MRS. ANNA BOTSFORD COMSTOCK.

"My subscription to AMERICAN FORESTRY I have never regretted. Its illustrations are superb—and the book should be an inspiration to every American to take care of the trees."

CHARLES E. TEALE.

"I have enjoyed the AMERICAN FORESTRY magazine very much through the year, and am glad to be a member of the Association, as I am greatly interested in the preservation of trees, birds and wild flowers."

CLARA M. BOLTZ.

"The Forestry magazine grows better daily."

MISS IDA C. HINSHAW.

"AMERICAN FORESTRY I used to think a luxury, but I have decided it's a necessity and find it grows more interesting all the time."

MRS. A. HOWARD HINKLE.

"I never want to be without American Forestry."—H. E. Zimmerman, Chicago, Illinois.

"I am a subscriber to the magazine and have found it very interesting and helpful."

G. W. HULT,
Portland, Oregon.

"I think that the AMERICAN FORESTRY magazine is doing more among educational lines in the ways that I believe effective than all other agencies combined. I have felt for a long time that the scientific bureaus have missed the real points of attack in the literature which they issue. You seem to have caught the need of the people."

DEAN STANLEY COULTER,
Purdue University, Lafayette, Indiana.

"I am enclosing payment for my annual subscribing dues. This begins my fourth year and ever find the magazine more and more interesting."

MRS. CATHERINE HUBBARD DAVIS,
Greenwich, Connecticut.

"I am heartily in sympathy with this work. I think it is a thousand times better to plant memorial trees than to put up marble shafts. I do feel that it will be good for the children to see your excellent magazine while they are small—5 and 9, and even though girls—for the women all over the United States will soon be voting and maybe we can have as good a government as New Zealand which was told of in a late number of the *Ladies Home Journal*—but it is so full of only stories that I have discontinued it and think AMERICAN FORESTRY will be better for the children."

FRANCES G. ANDREWS.

"Permit me to congratulate you upon the methods pursued by your organization and upon the effective type of literature and publicity which you are using. This office receives a constant flood of communications and printed matter from organizations of almost every description, hence my opportunity for comparison is, perhaps, unusually fortunate. Under the methods pursued, the appeal of your organization is almost irresistible. I am glad this is true because I am in sympathy with your work."

MRS. BURRITT HAMILTON,
President, Michigan State Federation
of Women's Clubs.

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference. Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 875, Care American Forestry Magazine, Washington, D. C. (1-3)

Man to be discharged from the Army September 30th desires position in forestry work, with lumber or railroad company or assisting in investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, 1913. Has had experience in orchard work, clearing land, improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of gravel roads, and other improvement work. Has executive ability and gets good results from men. Please address Box 880, care of American Forestry Magazine, Washington, D. C. (9-11)

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

WANTED—Position with Lumber Company or Private Concern by technically trained Forester with five years practical experience. Box 820, care American Forestry.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

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SEALED bids in duplicate, marked outside "Bid, Chilquin Timber Unit" and addressed to Superintendent, Klamath Indian School, Klamath Agency, Oregon, will be received until twelve o'clock noon, Pacific Time, Thursday, April 15, 1920, for the purchase of timber on a tract, in townships 35 and 36 south, ranges 7 and 8 east of Willamette Meridian in Klamath Indian Reservation, lying south of the Sprague River. The said unit includes about 10,000 acres of unallotted land with an estimated stand of one hundred sixty million feet as to which contract will be made with the Superintendent and about three thousand acres of allotted lands with an estimated stand of forty million feet as to which separate approved contracts with the Indian owners may probably be made. More than ninety per cent. of the timber within the unit is western yellow pine and the remainder is sugar pine, incense cedar, and red and white fir. Each bid must state the price per thousand feet Scribner Decimal C. Log scale that will be paid for timber cut and scaled prior to April 1, 1924. Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs by three year periods. No bid of less than three dollars and fifty cents (\$3.50) per M. feet for yellow pine, sugar pine and incense cedar, and one dollar and fifty cents (\$1.50) for other species during the period ending March 31, 1924 will be considered. Each bid must be accompanied by a certified check on a solvent national bank, payable to the Superintendent of the Klamath Indian School, in the amount of Twenty Thousand Dollars (\$20,000.00). The deposit will be returned if the bid is rejected but retained as liquidated damages if the required contract and bond are not executed and presented for approval within sixty days from the acceptance of a bid. The right to reject any and all bids is reserved. Copies of the bid and contract forms and other information may be obtained from the superintendent, Indian School, Klamath Agency, Oregon.

Washington, D. C., January 21, 1920. CATO SELLS, Commissioner of Indian Affairs.

"We are never too busy to read your admirable magazine, *AMERICAN FORESTRY*."

C. H. PEARSON,
New York City.

"I am very glad to accept membership in the American Forestry Association and I shall do all that I can to promote an interest in forestry work. This end of our state is now awake to the need of it. I feel that this work is most important educationally."

ORTON LOWE.

"I have just received the last number of *AMERICAN FORESTRY* and I am delighted with it."

R. A. BULLOCK,
Boston, Mass.

"I think that your plan to get out a technical edition is excellent, and I shall be glad to receive it. Since my father takes the regular edition, this will enable me to see both, and I should not like to miss the usual number even with a technical edition in place of it."

PHILIP T. COOLIDGE,
Watertown, Mass.

"I wish to congratulate you upon the happy solution of the problem of a popular magazine on technical forestry subjects suitable for the professional members and a magazine which deals with the popular side of forestry and related subjects."

F. W. BESLEY,
State Forester of Maryland,
Baltimore, Md.

"I always greatly enjoy the Association's magazine and look forward to its coming. I know of no more interesting problems than those of our forests and none which the public more needs than the kind of enlightenment which the Association gives."

MISS FAY INGALLS,
Oyster Bay, N. Y.

"The *AMERICAN FORESTRY* magazine is beautiful, useful, and interesting—dealing with a subject all important."

DAVID B. BIRD,
Chicago, Ill.

"I am very much interested in the Foresters Edition and wish to congratulate you upon the excellency of the subject matter. I wish it were possible for you to get out these editions often. It seems to me that the present is a critical time in the forestry movement and that we have a great deal to gain or lose in the immediate future. There certainly is no better agency than *AMERICAN FORESTRY* to disseminate the right kind of information for the forestry interests of the country."

EDMUND SECREST,
State Forester of Ohio.

"The Foresters Edition of the *AMERICAN FORESTRY* was a very interesting number to me."

R. C. JONES,
State Forester of Virginia.

STOP THE DECAY OF TREES

WHENEVER the limb of a tree is blown off or becomes diseased, the stump should be sawed off even and painted with creosote or tar paint; otherwise decay will set in and spread to other parts of the tree.

Oftentimes even a nail hole will so injure the bark that it will come off leaving the wood underneath unprotected. If these spots are left bare, decay will set in and seriously endanger the tree. A coat of creosote or tar paint will prevent spread of decay and gradually the bark will grow over the bare place again.

BIG PECAN GROVE

THE possibilities of pecans in Texas have scarcely yet been realized, and the remarkable progress being made is proving astonishing to many old-timers. Some of the pecans brought to the Extension Service, A. and M. College of Texas by J. A. Evans, the pecan specialist, as samples of the nuts gathered from trees under his care are indeed excellent specimens, and efforts are under way to make arrangements for grading and classifying pecans so that producers of excellent varieties may reap a just reward for their labors.

The owners of the old Turner farm near Irwin, Texas, which Mr. Evans visited a few days ago for the purpose of giving advice regarding the advisability of growing pecans and incidentally fruits and berries, evidently see great possibilities in pecan production, since it has been decided to establish a big pecan grove at this place. Mr. Evans reported that he found one hundred acres well adapted to pecans and berries, but that there was no clay subsoil for peaches.

KILL PREDATORY ANIMALS AND PROTECT GAME.

BEN LILLY, who has killed 190 mountain lions in the last seven years, and is probably the greatest living lion-hunter, has reached the conclusion, after years spent on the trail of this beast, that where deer are plentiful, an average of 100 per year are killed by each adult lion. "In the spring," says Mr. Lilly, "a mother lion with young will kill a fawn or a calf every day." He believes that the great question in game protection is to kill off the predatory animals. Judged by practical results, Mr. Lilly is one of the most successful game protectionists in America.

MUNICIPALITY OPERATES SAWMILL

PROBABLY the only city in California to operate a mill for the production of lumber for its own use is San Francisco. Its mill, at Groveland, south of Sonoma, Tuloume County, now is in operation. One hundred men are employed. (*The Timberman*, June, 1919.)

